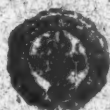


The Canadian Medical Association Journal



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The Canadian Medical Association Journal

VOL. VII.

JANUARY, 1917

No. 1

PYLORIC STENOSIS IN INFANTS

BY W. E. GALLIE, M.B., AND L. B. ROBERTSON, M.B.

Toronto, Canada.

DURING the past few years the attention of the surgical staff of the Hospital for Sick Children has been called to a condition of obstruction at the pyloric opening of the stomach, occurring in infants, which had hitherto passed unrecognized, or if recognized had been treated with more or less success by purely medical measures.

From a review of the literature and from our own experience it is evident that if this condition is untreated the mortality is nearly 100 per cent. Under medical treatment, which consists of proper feeding and frequent gastric lavage, a certain percentage slowly recover. According to the records of some observers, of whom Robert Hutchison is one, this has been as high as 64 per cent; according to others, as low as 40 per cent. We are informed by the physicians in charge of pædiatrics at the Children's Hospital that the percentage of recoveries in their clinic and in private practice is somewhere between these rather wide extremes. It is not the intention of this paper to discuss the medical treatment of the condition except insofar as it affects the surgical treatment. Attention will be drawn to the advisability of attempting the cure of these patients first by medical measures, but it must be pointed out that this form of treatment is very tedious and sufficiently doubtful to require the sharpest attention of the physician, to see that the patient does not slip past the mark, beyond which no form of treatment can save him. These patients have a habit of remaining in a stationary condition for days or weeks and then suddenly succumbing to

Read at the Annual Meeting of the Ontario Medical Association, June 1st, 1916.
Received for publication October 6th, 1916.

inanition. We have therefore come to recognize that if these patients do not show a prompt response to medical treatment, some radical measure must be adopted if an enormous mortality rate is to be prevented. But if any degree of success is to be obtained from surgical treatment, it is imperative that the operation be performed before the starvation of the patient makes such a surgical operation dangerous.

The symptoms of pyloric stenosis in infants are very uniform and clear cut. The condition occurs, in the majority of instances, in healthy nursing babies. All goes well for a week or two and then vomiting after feeding suddenly begins, rapidly becoming worse and developing a projectile character. Bowel movements become less and less frequent, until absolute constipation is established. The weight rapidly falls. Examination of the abdomen shows distension of the stomach with visible peristalsis passing from left to right. Palpation slightly to the right of the middle line above the umbilicus usually discovers a hard round tumour about the size of an acorn, freely movable, which can be demonstrated to be the hypertrophied pylorus. The vomiting sometimes comes on gradually, developing from a simple regurgitation, but in the majority of cases it begins suddenly and assumes its projectile character at once. It may occur in the midst of or immediately following feeding, the whole of the feeding being expelled for a distance of several feet. Sometimes a greater quantity is vomited than was taken at the last feeding indicating abnormal retention of food in the stomach. If the condition is unrelieved the vomiting increases in frequency until it occurs with every feeding and no food whatever reaches the infant's intestine.

Coincident with the onset of vomiting, constipation develops, at first as a reduction of the frequency of the stool and then as a reduction in its size. Gradually all faecal material disappears and several cases have been admitted in which no bowel movement had occurred for nearly a week. Similarly there is a reduction in the outflow of urine, and cases are on record in which an incorrect diagnosis of acute nephritis with suppression had been made owing to the cessation of urinary outflow.

Naturally the weight falls, the loss being directly proportionate to the severity of the vomiting. Several of our cases had reached a marked degree of emaciation before admission, making any form of treatment a forlorn hope.

To establish a diagnosis is quite simple in many instances. The physical examination shows the abdomen soft and not dis-

tended, thus excluding peritoneal inflammation and intestinal obstruction of any form. There may be considerable distension of the stomach but the most noticeable feature in relation to the stomach is the presence of visible peristalsis. This may be spontaneous or may be produced by flicking the abdominal wall or giving a small quantity of food. The waves are large, two or three inches long, extending vertically across the stomach and passing rapidly from left to right. Often a second wave is commencing before the first has reached the region of the pylorus. Visible peristalsis of the stomach may be taken as pathognomonic of pyloric obstruction.

The presence of a tumour is very constant although there may be some difficulty in locating it. Sometimes it can be felt immediately and at other times ten or fifteen minutes may be spent before it can be found. This is readily explained by the findings at operation, the tumour sometimes being hidden in the angle between the bodies of the vertebra and their transverse processes. A good method of locating it consists in standing on the left side of the patient and palpating deeply in the upper part of the abdomen slightly to the right of the middle line and above the umbilicus. The whole of this area should be explored, pressing deeply against the posterior abdominal wall and moving the abdominal contents freely about so as to change the position of the tumour and make it easier of detection. In all of our cases but one it was possible to demonstrate the presence of a tumour.

In corroboration of the diagnosis, it is frequent practice to attempt the passage of a duodenal catheter. In normal infants it is possible to pass a 17 mm. catheter through the pylorus in from ten to fifteen minutes. If any but the mildest degree of spasm or stenosis of the pylorus exists the duodenal catheter cannot be passed.

Before attempting to treat such patients it is necessary to understand something of the nature of the condition present. At autopsy and at operation we have found from slight to moderate dilatation of the stomach with hypertrophy of its walls. (See Fig. 1.) Surrounding the pyloric orifice is situated a smooth round swelling varying in size from that of a small to that of a large hazel nut. It is decidedly white in colour, in marked contrast to the neighbouring stomach and duodenum. The degree of whiteness varies with the density and size of the tumour. In some cases the tumour is quite as hard as cartilage, while in others it is more of the consistency of uterine muscle. If an incision be made into the tumour

in the living subject, it will be found to resemble quite closely fibro-cartilage in consistency, colour, and in the fact that there is practically no bleeding. Dissection of the specimen at autopsy shows the tumour to consist of the enormously hypertrophied muscle wall of the pylorus including both circular and longitudinal fibres. (See Fig. 2.) This hypertrophy has resulted in a stenosis of the pyloric outlet of the stomach to such a degree as to prevent the passage of food. Even on the operating table it is impossible to force gas past the obstruction, and at autopsy the ordinary catheters cannot be passed into the duodenum. The stenosis is due entirely to the hypertrophied muscle, no diminution in the size of the tube of mucous-membrane being present, as can be demonstrated in transverse sections and by removing the muscular coat. The hypertrophied muscle varies from three-sixteenths to three-eighths of an inch in thickness. Sections of the tumour show the swelling to be due both to increase in the size and the number of the muscle fibres.

The question of the causation of such a pathological condition is as yet enshrouded in mystery. There is nothing in the development of the viscera to account for it and yet it is certain that the condition is present before birth, as such a degree of hypertrophy could not occur in the two or three weeks during which food has been entering the stomach. Some have thought that the condition arises in a state of spasm of the pyloric sphincter, the mild cases being the result of spasm alone, and the severe cases, due to a superadded hypertrophy with stenosis, but of this we have no knowledge as all the cases we have seen both at autopsy and at operation have been typical cases of hypertrophic stenosis. It is a noteworthy fact, however, that symptoms rarely appear before the third week of life so that it seems likely that obstruction which is severe enough to produce symptoms is the result of a combination of congenital hypertrophy and of spasm.

With the establishment of a diagnosis the rational indication for treatment is the relief of the obstruction. Whether the treatment shall be surgical or not depends entirely on the completeness of the closure of the pyloric outlet. If the patient is rapidly losing ground with vomiting of all its food, absolute constipation and suppression of urine, the indication is for immediate operation, as no other form of treatment can possibly save the patient. If on the other hand the symptoms are not so severe it is wise to

study more accurately the degree of obstruction produced and to try to relieve any pyloric spasm which may be present by gastric lavage. When such a patient is admitted to the wards it is the practice of the physicians to make an accurate record of the weight and to watch the reaction of the stomach towards food. A measured quantity of breast milk is fed to the patient and after the lapse of the time ordinarily required for the emptying of the stomach the contents of the stomach are aspirated and measured. In mild cases the amount retained in the stomach is small and the prospect of the relief of the condition by medical treatment is good. Under regular gastric lavage the retention may steadily diminish and the symptoms correspondingly improve. If on the other hand the retention shows a daily increase with exaggeration of the symptoms, recourse must be had to immediate surgical intervention. When the frailty of the thread which connects these infants with life is remembered, the futility of dallying over ineffective therapeutic measures must be appreciated. The only way of saving such patients is to get a regular supply of food past the stomach and the only way of accomplishing this is by operation.

Until recent years the operative treatment of pyloric stenosis has consisted of an ordinary posterior gastro-enterostomy. Several writers have reported good results from this operation but we have had no personal experience with it. It would appear to be a dangerous procedure, however, as it is nearly impossible to do a complete gastro-intestinal suture in less than forty-five minutes, and one must remember that these patients are very ill and usually less than a month old. The operation which we have employed in these cases is known as the Webber-Rammstedt method. The abdomen is opened by a small incision through the right rectus above the umbilicus. The tumour is discovered and delivered over the abdominal wall and the appearance, thickness and density noted. By squeezing on the air in the stomach the degree of stenosis can be demonstrated. On the surface of the white tumour can be seen the small blood vessels passing on both sides of the pylorus from below upward. Fortunately, along the upper border there is a space about an eighth of an inch wide which is practically bloodless and this area is used for the incision. The tumour is held firmly between the thumb and forefinger of the left hand and an incision is made into the tumour in the line of the axis of the gut, extending the full length of the swelling. This incision is carefully deepened until the mucous membrane begins to bulge into it. The external surface of the mucous membrane is then exposed through.

out its whole length. The muscle is so hard that when the incision has been completed very little retraction takes place so that something more is necessary to make sure that the stenosis is relieved. With the points of a Mayo scissors or with dissecting forceps, the muscle is gently separated from the mucous membrane and the incision stretched open so that the mucous membrane is exposed for a width of an eighth of an inch or more. It will then be seen to be of large lumen and to bulge freely into the incision. That the stenosis has been relieved can be demonstrated by squeezing air through the pylorus from the stomach or by passing a stomach tube into the duodenum. Fortunately there is practically never any bleeding in the intestinal wall but if any small vessels have been cut they must be tied. The viscera are then returned to the abdominal cavity without further manipulation and the abdomen closed. During the operation the patient is kept surrounded with hot water bottles and the limbs are wrapped in non-absorbent cotton. As little manipulation of viscera as possible is employed and the time of the operation is reduced to a minimum, usually from fifteen to twenty minutes. With these precautions it is remarkable how little surgical shock is present.

The post-operative treatment is of the utmost importance and in all except the purely surgical details is directed by the staff in pædiatrics. Briefly the measures employed are as follows:—

1. Hypodermoclysis immediately following operation, of normal saline and 4 per cent. glucose solution. From 100 c.c. to 200 c.c. is employed. This may be repeated during the next few days.
2. Stimulation in the form of the hypodermic injection of adrenalin in 5 minim doses.
3. Measures to keep up the temperature of the patient to normal such as the use of hot water bottles and a special coat made of cotton sometimes used for premature babies.
4. Attention to the position of the patient. Until the effects of the anæsthetic have passed off the child's head is lowered, after which the position is changed to the semi-upright, to facilitate the emptying of the stomach and the eructation of gas.
5. Careful feeding. As soon as the effects of the anæsthetic have passed off, usually an hour after the operation, a few drachms of water are given and an hour later a mixture of three drachms of the mother's milk and a drachm of water. This is repeated at regular three hour intervals. Of the feeding of the infant nothing further will be said except that if at all possible, breast milk should be provided and the normal nursing of the child interrupted by

not longer than a week or ten days. Careful feeding is absolutely imperative, as digestive upsets are very apt to lead to fatal results.

Following operation the successful cases run quite a typical course. The feedings are taken readily and are retained, although during the first few days occasional vomiting may occur. This vomiting is usually of the regurgitant type, rarely explosive. Projectile vomiting after operation is usually suggestive of incompleteness in the relief of the obstruction. With the administration of fluid subcutaneously and by mouth the excretion of urine returns to normal and in a day or two faecal material begins to appear in the stool. In a week or so normal bowel movements have been reestablished although a considerable diarrhoea is a frequent sequel. After an initial loss of weight extending over two or three days, the weight begins to rise and if no setbacks occur, the rise is continuous. After the lapse of two or three months, these patients cannot be distinguished from normal children.

Outside of the purely medical complications which involve these patients, several surgical contingencies have to be considered. Fortunately shock is rare but if present is combatted as described. Haemorrhage must be guarded against most carefully. One of our patients died on the day following operation and at autopsy a great quantity of blood was found in the peritoneal cavity which had come from a small bleeder in the pyloric incision. Before dropping the viscera back into the abdomen we are now careful to see that all haemorrhage has ceased and the intestine is allowed to rest in the abdominal incision for five minutes or more without any constriction of the blood vessels of the mesentery or omentum if there is any suspicion of oozing. There is the usual danger from infection of the abdominal wound which is relatively more serious in these emaciated infants. In relation to the technique of the operation itself, one point is essential, that the constriction shall be completely relieved. In one of our patients who died a few days after the operation, without relief of the symptoms, autopsy showed that the incision had not been sufficiently long to divide all the constricting muscle nor had the muscle been stripped back enough to allow bulging of the mucosa. This point is now scrupulously attended to. With greater experience in handling these cases we now feel that the mortality can still be considerably lowered by the elimination of these surgical complications.

During the past two years sixteen cases of undoubted pyloric stenosis have been treated surgically in the Hospital for Sick Children. Of these sixteen cases, eleven recovered, a morality of

31.2 per cent. Of the five fatal cases, one died of hæmorrhage; one died sixty hours after operation with no relief of the symptoms because of incomplete operation; a third case which died three days after operation was a very desperate case on admission, there having been absolute constipation for five days and vomiting of all the food. This patient ceased vomiting after the operation but had evidently passed the possibility of recovery before operation; the fourth case was a prostrated premature baby which had practically no chance from the beginning. It died about twelve hours after operation. Autopsy showed hypostatic congestion of the lungs, nephritis and colitis. The fifth died three days after operation in spite of the relief of vomiting, of general weakness.

Of the eleven cases which recovered, two died subsequently, of other conditions, and autopsies were obtained. The first died six weeks after the operation, of acute entero-colitis. All the symptoms of pyloric stenosis were relieved by the operation and the case was a favourable one for complete recovery until the intestinal infection developed. This case is of particular interest because at the operation a small section of the muscle was removed for microscopical examination and it is now possible to compare this with the sections made at autopsy more than a month later. It will be observed that the relief of the obstruction has made no difference in the appearance of the muscle fibres, which are greatly increased in size and in number in both. Comparing the cross section of the pylorus made at autopsy with a normal at the same age it will be observed that the muscular coat is five or six times the normal thickness. (See Fig. 3.) It would also appear that there is a corresponding increase in the size of the lumen of the pylorus. The section also shows clearly what happens as a result of the incision through the muscle. In the gross the peritoneum was fully healed over the incision and no evidence of the incision was to be seen. The histological specimen shows that after the operation the peritoneal edges of the incision opened out widely and that the peritoneum grew over the edges and down into the incision to meet on the exposed mucosa. Separating the lumen of the bowel from the peritoneal cavity at this point is the mucous membrane, the submucous areolar tissue, the muscularis mucosæ which evidently escaped the scalpel, a small quantity of white fibrous tissue and the peritoneum. Whether this permanent weakening of the wall of the intestine will have any late effects, time alone will tell. (See Fig. 4.)

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FIG. 1.—Autopsy specimen from a case of pyloric stenosis. It shows moderate dilatation and hypertrophy of the stomach and the typical tumour at the pylorus.

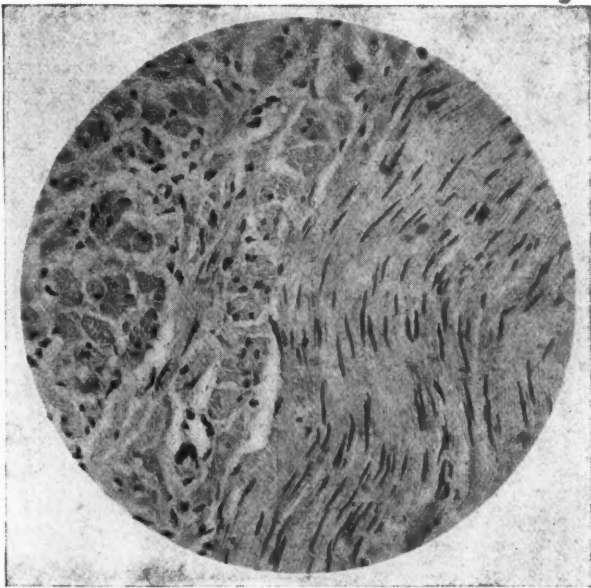


FIG. 2.—Section through the wall of the tumour showing the junction of the circular and longitudinal muscles. It demonstrates that the tumour is the result of true hypertrophy of the muscle.

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FIG. 3.—The figure to the left is a photograph of a section of a pylorus upon which a Webber operation had been performed six weeks previously. It shows the persistent thickening of the walls and a dilatation of the lumen. On the left side of the figure can be seen the healed incision through the muscles. The figure to the right represents a normal pylorus from a child of about the same age.

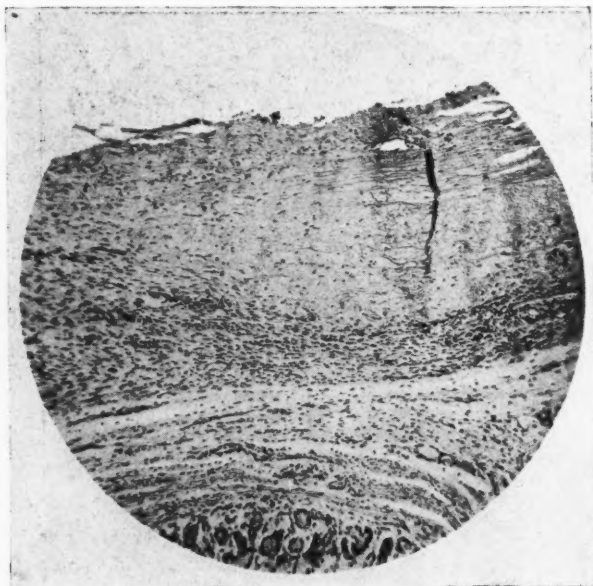


FIG. 4.—A section through the wall of the pylorus at the bottom of the healed Webber incision shown in Fig. No. 3. From below upward it shows, mucous membrane, muscularis mucosae, fibrous tissue and peritoneum. The wall is very thin at this point.

The second case died of pneumonia and empyæma about a year after the operation. The relief of the pyloric obstruction had been complete and recovery perfect. At fourteen months of age he appeared to be a normal baby. At autopsy the pyloric enlargement was found to persist although the ratio of its size to that of the neighbouring intestine was slightly smaller. It is evident therefore that the pathological condition present is not one suddenly developed or easily changed.

The remaining nine patients are alive and well, apparently suffering no ill effect from their pathological condition or from the operation.

In conclusion, we wish to add our testimony in favour of the operative treatment of pyloric stenosis. While admitting that many of these cases, in which the hypertrophy of the muscle is slight and the obstruction mostly due to spasm, can be relieved by medical treatment, a warning must be issued against persisting in this treatment if prompt improvement does not occur. Many cases treated in this way have undoubtedly died which might have been saved by operative relief of the obstruction. A further warning must be sounded against delaying operation until the patient is so weakened by starvation that he is no longer a safe subject for an abdominal operation.

The writers are much indebted to Dr. C. L. Starr for the opportunity to study the cases admitted to the public wards of the Children's Hospital and for permission to include in this report the cases operated on by him.

TUBERCULOSIS OFTEN OF SECONDARY IMPORTANCE TO OTHER PATHOLOGICAL CONDITIONS

BY C. D. PARFITT, M.D.,

Gravenhurst, Ontario

OUR present conception of tuberculosis is that there has been tuberculous implantation existing for many years in most people and that clinical tuberculosis is the result of lowered resistance to the infection. Tuberculosis is a physical incubus which must be reckoned with as possible in everyone, and, likewise, the tuberculous patient is subject to other ills. The development of pulmonary tuberculosis is often influenced by the presence of other chronic disorders (of either infective or functional nature) which are of such individual and diverse character that they are relatively slighted in treatises dealing with ætiological and modifying conditions. Whatever the cause of lowered resistance which allows tuberculosis to get the upper hand, the course of the tuberculosis is certainly influenced by other physical disorders related to it or quite distinct from it. If one can banish or relieve these, the tuberculosis will often be taken care of by the improved physical resistance.

Sometimes diseases which, from the standpoint of diagnosis, must be differentiated from tuberculosis, may be associated with an actual tuberculosis. Desirable as it is to have a single cause explain all symptoms, one diagnosis will then be insufficient. The recognition of the tuberculosis may too readily stop further investigation.

Dr. Lawrason Brown's¹ series of cases of Hodgkin's disease and carcinoma with tubercle bacilli in the sputum, illustrates such coincidence and emphasizes the intricacies of diagnosis. There are, however, many pitfalls with diseases of more commonplace nature. Focal infection, such an important factor in systemic disease, plays an important part, also, in a chronic disease like

Read at the Twelfth Annual Meeting of the National Association for the Study and Prevention of Tuberculosis at Washington, D.C., May 12th, 1916.

Received for publication August 11th, 1916.

phthisis. Four years ago at this meeting, Dr. Thayer provoked an interesting discussion on the differentiation of suspected tuberculosis from focal infections of the head. My recollection is that the tuberculosis under consideration was a matter of suspicion, because of constitutional symptoms, when definite signs of pulmonary lesion were lacking. Cases with such focal infections are occasionally found which show also physical signs of a pulmonary tuberculosis, more or less pronounced. In such instances there is even greater simulation of phthisis, and the stigmata of that disease as found in the history, e.g., the evidence of toxæmia, blood spitting, the questionable findings of tubercle bacilli and a tuberculin reaction, are confusing and leave much to speculation. In some of these cases the presence of tuberculosis is far from proven, while in others it must be accepted, but the secondary infection may fairly be considered as playing the more important part in the illness. Indeed in some instances the tuberculosis may rather be regarded as the secondary infection. The non-tuberculous infection may be the important depraving influence because of which phthisis has developed, or it may be a result of the general constitutional weakening produced by the tuberculous infection.

Some illustrative cases which I have noted fall into two groups, one where pathological conditions of the respiratory tract accompanied or simulated tuberculosis, and the other where disease of the abdomen or pelvis existed with pulmonary tuberculosis and fostered its development. In the first group are the following:

CASE 1. A woman has had recurrent bronchitis and mild constitutional symptoms of toxæmia for nine months. There are definite signs of infiltration in the left upper lobe and more diffuse signs of bronchitis elsewhere. The Von Pirquet test is positive. Accessory sinus disease is noted. The patient is referred to a rhinologist and after operative treatment she returns to the sanatorium for two months. On leaving she is apparently well. Bronchitis has quite disappeared except for a few small râles in a limited area near the site of greatest original intensity. She has gained seventeen pounds and there has been no fever since her operation. The sputum has been negative. M. Catarrhalis only has been found in washed sputum. Nine months later her physician reports excellent health.

Here there was possibly an old tuberculous lesion and there was a bronchitis secondary to a chronic sinusitis.

CASE 2. A man with symptoms referable to the chest for nine months, and cough, sputum, frequent bloody expectoration, loss of weight and recurrent fever for four months is found to have a bilateral basal bronchitis, with slight changes on percussion of the left side. An ophthalmic test with $\frac{1}{2}$ per cent. old tuberculin causes an intense local, general, and slight focal reaction. The sputum is negative. An extreme atrophic rhinitis is found and the whole nasal cavity is covered with adherent crusts. Treatment of this condition causes prompt disappearance of the cough, and expectoration

almost stops. The patient improves greatly in general condition and returns to his work of car foreman after five weeks' treatment. Since then he has not lost a day from work in nearly five years.

A bronchitis secondary to the rhinitis may here have activated an old tuberculosis, or there may have been a recent infection which in itself was secondary.

CASE 3. For four years a woman has had purulent expectoration, often persistently blood-stained. There has been frequent slight pleurisy, some dyspnoea and increasing weakness. Fever is rare. There is no anaemia. The Arneth index is consistently high. Intestinal stasis, frequent headaches and mild Raynaud's disease are accompanying disorders. The pulmonary signs are vague and inconsistent. A slight scoliosis can explain slight deformity and percussion changes. There is the history of nasal disease since early childhood for which there have been many operations including the opening of three sinuses. Repeated examinations with antiformin fail to reveal bacilli and animal inoculation is also negative. The sputum contains a practically pure culture of Friedlander's bacillus. An autogenous vaccine modifies the character of the sputum and produces local, focal and general reaction. Reaction is also obtained to 3 mg. of old tuberculin, local, general and slight focal. There is no material change in the pulmonary symptoms after six months' treatment.

A long standing bronchitis with bronchiectasis secondary to nasal disease may have, in this instance, permitted secondary tuberculous implantation, or may have furthered the development of an old lesion.

CASE 4. A young farmer for a year and a half has had constitutional symptoms of a toxæmia, with expectoration, and two small hæmoptyses. He reports that twice a single bacillus has been found in the expectoration. There is reason to doubt the finding. The chest examination shows a slight sclerosis of the left upper lobe and a slight diffuse bronchitis. Repeated examinations of the sputum with the aid of antiformin are negative and animal inoculation is also negative. Much inspissated secretion is noted in the larynx and trachea which can only be removed in part and with difficulty. Small white growths embedded in the mucous membrane of the larynx and at the base of the tongue are removed with punch forceps. A diphtheroid organism in almost pure culture is obtained. An autogenous vaccine is given irregularly for nine months, during which time the patient improves. A year and a half later the patient is perfectly well with only the sign of a slight sclerosis of the left lung remaining.

There was probably an old tuberculous involvement of the left lung; but the peculiar character of the agent causing the bronchitis suggests that this organism was the cause of illness.

In these cases, with one exception, measures other than those of a hygienic and dietetic nature materially helped to restore health, and in all, the possibly tuberculous condition of the subject may be considered relatively unimportant. In all of these patients a diagnosis of tuberculosis would be reasonable, and they could readily be classed in sanatorium records as moderately advanced

cases without bacilli, falling into the ranks of the 33 per cent. "bacillary cases found in sanatoria."

Notwithstanding the difficulty of proof and the vexed opinions of bacteriologists and clinicians, it is a matter of common experience that secondary, accompanying or intercurrent infections of the respiratory tract play an important, often a controlling, part in the course of pulmonary tuberculosis. The reactions to auto-genous vaccines, of local, focal and general character, themselves suggest the relationship between the organism found in carefully washed sputum and the pathological process.

Von Hansemann² maintains not only that in many cases of phthisis the tubercle bacillus, if present at all, represents merely a secondary infection, but also that even in true tuberculous phthisis it is only one of the ætiological factors. In a majority of instances of atypical cases he considers it possible to discover the special ætiological factor concerned, and believes that in all such cases it is more essential to deal with the primary condition than to remove the bacillus.

Lord³ in his clinical and pathological studies of non-tuberculous affections of the lungs finds that 10 per cent. of bronchopneumonias have well-marked indurative and ulcerative processes which clinically resemble pulmonary tuberculosis. Ash⁴ finds that 11 per cent. of cases which come to autopsy in institutions for advanced cases of tuberculosis are non-tuberculous. We must evidently be on guard for the atypical cases.

The cases of the second group present a more clear-cut illustration of my subject, since in all of them the existence of pulmonary tuberculosis is admitted and the question of differential diagnosis does not arise.

An indolent or retrogressive pulmonary lesion may quickly become active because of the development of tuberculous enteritis which is possibly amenable to surgical interference. Material improvement can be obtained in a fair proportion of cases if recourse to the surgeon is prompt, and I believe exploratory incision, at least, is warranted more frequently than it is done.

Five patients were referred to the surgeon for short-circuiting operations for tuberculous enteritis. Two are alive, six and five years respectively, since their operations. In one of these cases (Case No. 5) an advancing pulmonary lesion was arrested and the patient has not been as well for years as she is to-day, and she leads an arduous life. A third had nine inches of a hyperplastic tuberculous cæcum removed. This condition complicated an

advancing pulmonary lesion, with much cough and expectoration, and its influence upon the pulmonary condition is noteworthy. After the operation the patient coughed but three times in as many weeks and sputum was much diminished. He died six months later of spontaneous pneumothorax and was saved a good deal of suffering by the ileosigmoidostomy. These three cases emphasize the influence of a second area of tuberculous disease upon the symptoms and progress of the pulmonary lesion. Two cases died within two days of the operation. They were not good risks and the result shows that the operation should have stopped with the exploratory incision in one case. Also it is fair to say that in the other case I did not have the privilege of making the arrangements. Two months were lost after operation was first considered and the technique of the operation was subject to criticism.

CASE 5. A woman, aged thirty-five, developed phthisis during lactation. There was a long standing history of irregular pulmonary symptoms and of diarrhoea. Much sputum had been swallowed. Physical signs in moderate degree were present in three lobes. A thickened, tender caecum and sensitive transverse colon and sigmoid were felt. Marked peristalsis of the ileo-caecal region was usually visible. Obstruction was obvious and cramps and diarrhoea were of daily occurrence. Cough and expectoration increased during three months. The pulmonary lesion advanced and bacilli were found occasionally in the sputum, and also in stool. Relief for the abdominal distress was necessary. The patient was referred to the surgeon for exploratory incision with a short-circuiting operation in view. Tuberculous patches were found in the colon. An ileosigmoidostomy was done, and at a later operation, the distal end of the ileum was converted into an ostium. The intestinal condition became more endurable and the pulmonary condition gradually improved. Three years after the operation the patient was apparently cured. Two years later the patient writes that her health, notwithstanding much strain, has been better than for many years.

Intestinal adhesions following an appendicectomy caused symptoms which simulated tuberculous enteritis and awakened an old pulmonary lesion. Surgical interference has thus far given great relief and the pulmonary condition has become quiescent.

CASE 6. A woman, aged twenty-four, with pronounced history of family phthisis, of exposure, and with signs of infection of glands, lungs and rectum during fifteen years, has had mild symptoms of clinical tuberculosis for six months with recent slight hæmoptysis. The appendix had been removed four years earlier and suppuration for several weeks followed the operation. Since the operation tenseness of the abdomen and radiating pains on the right side have been frequent. For two months diarrhoea, cramps and local sensitiveness have been marked. During five months' observation there was no expectoration, but at two menstrual periods there was slight hæmoptysis. Old disease was found at the apices and sometimes an occasional crepitation was heard. The pulmonary condition seemed relatively insignificant and because of increasing abdominal distress and rising temperature an exploratory operation was urged. Unfortunately, the faeces had not been examined for bacilli. Only adhesions around the caecum were found. Notwithstanding ether anaesthesia the pulmonary condition did

not relapse. The abdominal symptoms and general health have been greatly improved during the nine months since the operation and the pulmonary symptoms have subsided. The patient has resumed work.

Chronic appendicitis may be the dominant disorder in cases in which improvement hangs fire. The removal of an appendix can change a relapsing pulmonary patient into an arrested case or hasten recovery in a patient with a recent lesion. In two instances here given ability to work at the usual occupation was quickly recovered after removal of a tuberculous appendix in one, and a non-tuberculous appendix in the other.

CASE 7. A man, aged thirty-one, relapsed after a six months' period of work at the end of four years' treatment for phthisis. He had suffered a number of relapses of short duration, and, during much of the time, intestinal indigestion and abdominal sensitiveness had been marked. An expert on digestive disorders who was consulted, considered him a neurasthenic. There is evidence of long standing disease in four lobes and recent signs at the left apex. A tender appendix is found. The patient is ill for several weeks with combined pulmonary and abdominal symptoms. After two months the appendix is removed and on microscopical examination it proves to be tuberculous. Variable symptoms of indigestion recur during an additional year of "cure", after which time he is seen again. The pulmonary lesion is quite inactive, but there are pronounced symptoms of intestinal intoxication, along with a marked indicanuria. With modified diet, exercise and work, these symptoms largely disappear and quite hard work has now been carried on for eighteen months.

CASE 8. A man, aged twenty-five, suffered from recurring abdominal pains for five years following typhoid fever. After four years symptoms of a mild toxæmia developed and he was treated as tuberculous. There is an indolent tuberculosis of the right lung. Cough and expectoration have been absent, but after an influenzal cold bacilli were found. The appendix can be felt and he is seen during a characteristic attack. A very long and thickened appendix attached to the sigmoid is removed, which, on microscopical examination is not found to be tuberculous. Three months after the operation he returned to his work which has been consistently followed for three years. He is apparently cured, in excellent health, and the lungs show few signs of the old lesion.

A latent focus of infection in the pelvis can produce a toxæmia resembling tuberculosis. The removal of bilateral pyosalpinx cleared up irregular febrile attacks in a case of indolent pulmonary disease. No symptoms pointing to pelvic disease had been obtained in the history and there was nothing to indicate the need of examination until pains at a menstrual period, several months after the patient first came under observation. Six years later this patient was in very good health and when last seen, three years ago, there had been no material change in the lung lesion.

Reflex and congestive disorders occurring with menstruation can so depress the general health that sufficient resistance to overcome the pulmonary disease cannot be gained in the interval.

The removal of both ovaries and the appendix benefited to a remarkable degree a woman who was so prostrated by the menstrual period that it seemed impossible that any gain could be made until the functional derangement was altered. An advanced pulmonary tuberculosis improved rapidly when the recurring prostrating headaches and severe abdominal symptoms were relieved by operation.

CASE 9. A married woman, aged thirty-nine, has for two years had symptoms in varying degree of an active advanced tuberculosis. There is also mild hyperthyroidism. Two attacks of appendicitis have occurred in thirteen years. The patient has long been subject to frequent intense headaches with vomiting. Severe dysmenorrhœa is usual. Examination reveals a disseminated tuberculosis affecting all lobes. Bacilli are present. A small movable mass and tenderness are noted in the right iliac fossa. The thyroid and heart are enlarged. Hæmoglobin is 75 per cent. and the Arneth index 83. For three months there is both constitutional and local improvement. The third menstruation was accompanied by excruciating headache, nausea, vomiting and frequent micturition. Pain in the right iliac fossa was constant, radiating to the sacro-iliac region. Tenderness and rigidity were marked. After similar symptoms and signs were observed at the next period, she was referred to the gynæcologist as it seemed that further improvement was impossible in the face of such prostrating illnesses. Because of the not distant menopause, ovaries as well as appendix were removed. The appendix was bound down by a very short mesentery, but it did not appear to be diseased. The ovaries were cystic. When the patient left, three months after the operation, she was greatly improved. There was no abdominal pain, headaches were rare, hæmoglobin was 95 per cent. and physical signs had materially diminished. Four months later she writes that for periods she has been without cough and expectoration and that her health has improved in every way.

The indolent tuberculosis occasionally seen in women who give a history of excessive menstruation is possibly the result of and is maintained by this recurrent drain. I have found that sanatorium treatment alone does little for these patients and they have been referred after a short period of observation and training to a gynæcologist. Their history has ultimately been satisfactory.

Five per cent of my sanatorium patients during the last seven years have had to undergo major surgical operations with general anæsthesia;* but of twenty-one (four underwent two operations) only three have failed to be materially improved after operation. These three were all desperate cases and the patients died. The need of operation was obvious in most, but was urgent only in two cases. In spite of surgical shock and anæsthetic, the pulmonary condition in no case became worse. In some instances the improvement in the local tuberculous condition was dramatic, as soon as the basic cause of illness was removed. Seven became

*Gas with oxygen was alone used in fifteen cases; ether was used in some combination in nine; chloroform alone or in combination in five.

"apparently cured", three "arrested", eight "improved". Of the "improved" four subsequently died.

Apart from the urgency that demands immediate operation, surgical measures evidently may be of great value in the treatment of phthisis. Their proper use is one of our responsibilities and one of our problems. Billings⁵ emphasizes the necessity of the removal of the focus of infection as a fundamental principle in the treatment of systemic disease, especially of a chronic type. McArthur⁶ urges short-circuiting operations when excision cannot be undertaken, for intestinal tuberculosis other than the hypertrophic form, the abdominal operation, of course, depending upon the pulmonary and general condition. Exploratory incision may be necessary. For ileo-cæcal tuberculous disease operative interference is a not uncommon surgical procedure (Maylard⁷). Lane⁸ recommends radical measures to remove the depraving influence of intestinal stasis.

The tuberculous patient is of course not to be lightly subjected to operations, but time and opportunity may easily be lost by undue delay. Pulmonary tuberculosis may be taken as a final and complete diagnosis to the exclusion of any other. Unless each diagnosis is questioned, and, when established as tuberculosis, further looked into for other possible modifying disease, a considerable number of patients will fail to recover. It is, therefore, necessary to individualize in every case.

The important thing is the point of view that there may be a depraving influence within the body which can be found and remedied. Remediable disorders certainly occasionally prepare the soil for developing tuberculosis and help to further its progress when already established. When relieved of such handicaps a tuberculous patient may frequently develop sufficient resistance to obtain the relatively speedy arrest of his disease.

References:

1. BROWN, *Bull. Johns Hopkins Hosp.*, 1914, xxv, 112.
2. VON HANSEMAN, *Berl. Klin. Wchnschr.*, 1911, xlviii, 1.
3. LORD, *Boston Med. and Surg. Jour.*, 1905, clii, 537, 574.
4. ASH, *Jour. Amer. Med. Assn.*, 1915, lxiv, 11.
5. BILLINGS, *Jour. Amer. Med. Assn.*, 1914, lxiii, 899.
6. MCARTHUR, *Surg., Gynec. and Obst.*, 1906, August; "Tuberculosis," Ed. by Klebs, New York, 1909, 756.
7. MAYLARD, "Abdominal Tuberculosis," London, 1908.
8. LANE, "Operative Treatment of Chronic Intestinal Stasis," London, 1915.

BLOOD TRANSFUSION

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AS far as I know this subject has not been treated in a paper before this society. However, I do not desire to have the present paper considered as a full exposition of this important therapeutic operation, but merely to serve as a way of reporting a few cases of transfusion by one of the many methods now in use.

Three years ago in Boston I first became interested in transfusion by the Kimpton-Brown method and the cases I have to report were all done with Kimpton-Brown or Vincent's paraffined tubes between February and November 1st, 1916.

The transfusion of blood, from animals or human beings, for the relief of anæmia or purpuric diseases, has always had a romantic interest for the medical profession. In the year that Columbus discovered America, Pope Innocent VIII. was transfused with blood from three young healthy adults after the remarkable method of withdrawing some of his blood, injecting it into the donors, and then transfusing the patient. All four died.¹

Jean Daniel Meyer, a German physician, claimed, in 1667, to have been the first to perform the operation, presumably successfully.

In 1615, Libavius anticipated Crile's cannula by advocating arterial transfusion by means of a silver tube.

Experimentally in Oxford, in 1765, animals were bled to point of death and were resuscitated by transfusion by Lower.

In 1667, a Paris professor, Denis, saved the life of a patient by the transfusion of ten ounces of lamb's blood. Following this there were many cases of transfusion done and so many deaths occurred that in France and Italy transfusion was prohibited by law. Since then it has become clearly recognized that it is useless, as well as dangerous, to use whole blood from an animal of one species for

Read before the regular meeting of the Montreal Medico-Chirurgical Society, November 3rd, 1916.

Received for publication December 5th, 1916.

transfusion into an animal of another species. On the contrary, defibrinated blood and blood serum, especially from animals, have been commonly used in the treatment in man of hæmophylia, hæmorrhage neonatorum and other hæmorrhagic diseases. Horse serum, coagulose, and allied products are well-known and widely-used therapeutic agents.

Kartz, in 1875, injected defibrinated blood subcutaneously with good results and Bozzolo in Italy injected it into the pleural cavity. In animal experiments, Obolinski and others used intraperitoneal injections of defibrinated blood with a resulting increase in the numbers of red blood cells and a rise in the percentage of hæmoglobin.²

Hayem has also shown that the injection of defibrinated blood produces an increase of hæmatoblasts. In one of my cases, it was noted after a small transfusion that the blood slides showed nucleated red cells where none were present just prior to operation. This was a case of pernicious anæmia, Case 6 in the series.

In 1847 the syringe method was used by Sotteau and in 1883 Roussel reported sixty-two transfusions with thirty successes. In 1912, Tuffier used a paraffined silver cannula and about then Elsberg's classical cannula was perfected. The literature after this date is full of reports and descriptions of ingenious methods of transfusion.

Intramuscular injections of whole blood, of 10, 15 and 20 c.c. were carried out by Schloss with very good results in cases of hæmorrhagic diseases of the new-born.

To-day the concensus of opinion is that transfusion is the operation of choice and the injection of serum or defibrinated blood are to be used only when transfusion cannot be carried out or while preparing for it. Transfusion will do what the other expedients achieve and in addition fill up empty vessels with normal blood. This brings me to the consideration of the methods of transfusion. They can readily be divided into:

1. *The direct method* by (a) the union of artery to vein as done by Murphy, Carrel and many others by vessel suture. This requires considerable technical skill and hospital environment, is accurate, prompt and efficient. It necessarily must be available only to the few skilled in vascular surgery. (b) Connecting the vessels by an interposed cannula or joining the intima of the vein and artery by a short link cannula. Many operators have perfected special cannulæ of which are well known those of Crile, the two-piece cannulæ of Bernheim³ which telescope into each other,

and many others. In France, where tranfusion has been widely employed during the war, Andre Rendu, in the absence of special metal cannulæ has used successfully a connecting link made from a portion of a chicken's quill.⁴

2. *The indirect method.* (a) Syringe method of Von Ziemson which has become so perfected by Lindeman of New York. It is probably the best method in the hands of a skilled operator but has the disadvantage that it requires twelve to twenty glass syringes of 20-25 c.c. capacity which are expensive (\$100), and several highly skilled assistants are needed. (b) Other operators collect the blood from the donor in anticoagulant solutions, such as solutions of leech extract, herudin, citrate of soda, and oxalate solutions. The mixed blood and anticoagulant is then injected into the recipient. Of these methods the best is undoubtedly the soda citrate method and a strength of 0.25 per cent. is sufficiently strong to stop clotting. One uses 100 c.c. of a stock solution of 2.5 per cent. soda citrate solution for 900 c.c. of blood. In this connexion it has been demonstrated that soda citrate solution is harmless when injected into the veins of animals provided that the quantity does not exceed certain limits, which are clearly laid down. For a patient of 110 pounds weight, 15 gm. of soda citrate would be a fatal dose and 2 gm. is the quantity needed for 900 c.c. of blood, an average transfusion.⁵ A very full study of anticoagulants was published by Henry S. Satterlee, of New York, just recently.⁶

3. *Combined direct and indirect method.* The apparatus of L. J. Unger⁷ which was demonstrated last winter at the Royal Victoria Hospital before this society is used to provide a method of combined cannula and syringe transfusion. In this method saline is used to flush the cannulæ and the donor receives saline during the operation. George Miller, of Brooklyn, has invented a simple cannula with a stop valve with which he needs but one syringe and one assistant and uses no saline. He has carried out this procedure in his office. (b) Paraffined tubes, Kimpton-Brown and Vincent's. These are receptacles which collect blood from the donor without an intermediate cannula or any tubing and inject it direct into the recipient's vein. There is no clotting and the amount used in a transfusion is readily measured. It is quick, safe, can be carried out without skilled assistants and the chances of contamination of the blood are nil. I have transfused 600 c.c. in twenty minutes from the first incision till the dressings were in place on both patients. The Kimpton-Brown tube I have shown on a former occasion before this society. The Vincent tube, though not graduated, has one

obvious advantage, that owing to the needle adapted to it, one can withdraw blood from the donor without dissecting out his vein.

The many methods of transfusion have the one main obstacle to overcome—clotting of the blood. In the syringe method, preliminary stages of clotting often occur. Minot⁸, of Boston, has shown that blood will not clot if run through a paraffined cannula direct into oxalate solution, when chloroform is added. But clotting will occur if the blood is drawn with a syringe and then introduced into the solution. The chloroform renders inactive the anti-thrombin, allowing any free thrombin to clot the fibrinogen. This thrombin was not freed by flowing through the paraffined tube but it was freed even in the brief space of time while in the syringe. It would therefore appear that the syringe method even with saline or citrate solution does not totally prevent the early blood changes incidental to clotting. The paraffin method has no objection save the necessity of taking time to coat the tubes thoroughly. This I have found is quickly done with practice and at the Montreal General Hospital the operating room nurses prepare the tubes, which are always stored ready for use.

The indications for transfusion are many, and I will not go into this, as it is fully discussed in a paper by Ed. W. Peterson in the April, 1916, number of the *Journal of the American Medical Association*,⁹ beyond enumerating the following conditions where it is indicated:

Acute and chronic post-hæmorrhagic anæmia; cases of pathological hæmorrhage, peptic ulcer, typhoid, blood diseases, hæmophilia, purpuric diseases, purpura neonatorum, where 90–120 c.c. transfused often saves life. In hæmorrhages of the new-born where the mortality used to be 50–75 per cent. it has been reduced to 5–10 per cent by transfusion. In infants transfusion into the superior longitudinal sinus according to Helmholtz's method is the method of choice.¹⁰

Leukæmias, secondary hæmorrhagic diseases, as jaundice, nephritis, sepsis, poisoning by coal gas and coal tar products are all benefitted by transfusion.

All writers agree that preliminary to transfusion certain tests are necessary. The best donors are young healthy adults and the the recipients' immediate family are no better, though more easily obtained, than strangers. I have used stranger donors in nearly all my cases and thrice donors were of opposite sex from the recipient. All persons fall into four groups as regards agglutination, and donors are best when in the same group as recipients.

A Wassermann test should be made in all cases. Then the blood should be tested for agglutination and hæmolysis. The latter will not take place where agglutination does not occur, and only about 20 per cent. of bloods that agglutinate will hæmolyze as well. The latter complication is so serious that no transfusion should be done except in the most urgent case without testing for agglutination. Even after excluding chances of agglutination, hæmolysis, loosening thrombi, introduction of excessive quantities of blood or too rapid flow, certain unknown and not understood reactions will occasionally occur. These are most often found in cases of sepsis, high fever, or blood disease, rather than in cases of secondary hæmorrhagic anæmia.

Hæmolysis with many operators is not considered a great danger. Bernheim claims it is greatly "over-rated and unwarrantably feared". Others report many cases of transfusion without hæmolysis where no preliminary tests have been done. Personally I have a holy horror of its occurrence as any operator will have who has seen a serious case of it.

The method of testing for agglutination done in all my cases is that described by George H. Minot¹¹ of Boston. Personally he has given me practical instruction in the tests and I desire here to record my indebtedness to him.

It is necessary to test the patient's serum against the donor's red cells and the donor's serum against the patient's red cells. For a safe transfusion no agglutination should occur either way. However, one may be forced to use a donor whose serum is agglutinative towards the recipient's cells, for here the anti-agglutinin in excess in the patient's blood serum will likely counteract this tendency. One should not use a donor whose cells are agglutinated by the patient's serum.

Hæmolysis is indicated by vomiting, respiratory distress, pain low in the back, characteristic blush, sweating, a rise of temperature, chill, suppression of urine or hæmaturia. In infections hæmolysis has been observed with rapidly fatal results.

Percy in fifty-four transfusions reports three reactions with two fatal results where tests for agglutination and hæmolysis were negative.¹²

Ottenberg and Kaliski report 10 per cent. of toxic reactions in a series of 128 cases, not referable to agglutination or hæmolysis. Skin eruptions, urticaria and petechiæ are sometimes seen and a chill and a rise of temperature occur in about 10 per cent. of cases.

Personally I have seen no reaction of any kind save where

there was hæmolysis. No heart case, nephritic, diabetic or tuberculous subject should be used as a donor.

Donors will be found to vary in hæmostatic, hæmatopoietic and anti-toxic qualities. Consequently failure in cases of blood disease, pernicious anæmia, or sepsis, with one donor may be followed by success with another donor. In this connexion it has been established that immunity may be obtained in the donor with increased benefit to the patient. Ransom-Hooker¹³ produced a cure by transfusing 100 c.c. of blood from an immunized donor into a boy with chronic osteomyelitis who had not been relieved after many operations. His hæmoglobin was only 30 per cent. and a prompt recovery followed. Krida¹⁴ treated a case who had had multiple abscesses for four years with 400 c.c. of immunized donor's blood and the case was still well and had had no abscesses a year and a half after. I believe Libman, of New York, is doing similar work in immunized transfusions in cases of endocarditis due to the streptococcus viridens.

All my cases have been done in the Montreal General Hospital, and they include cases from the public services of Drs. Lockhart, Lafleur and von Eberts, and private cases referred for this treatment. There have been ten transfusions done on nine patients with three deaths, and one case of transient hæmolysis which recovered. One fatal case, the first of the series, was not due to the transfusion and it had very little effect either for good or ill. Another fatal case was due to a rapid, fulminating hæmolysis in spite of a negative agglutination test. However, my technique of testing was shortly after changed and I am now confident that the tests are more certain than with the first few cases. The third fatal case died from a repetition of the hæmorrhage for which transfusion was done as a preliminary to operation. The conditions for which the operation was done were anæmia due to gastric or duodenal hæmorrhage, two cases; anæmia due to hæmorrhage from hæmorrhoids, one case twice transfused; pernicious anæmia, two cases; anæmia due to placenta prævia and infection, one case; anæmia due to hæmorrhage caused by abortion, two cases; anæmia due to long-continued suppuration, one case.

The results will appear in the detailed case reports as follows:

CASE 1. Female, private case of Dr. Lafleur, Montreal General Hospital, February 2nd, 1916, Mrs. F. X., aged sixty years. Case No. M. 309. Patient exsanguinated, comatose from gastric hæmorrhages, transfused during operation of gastrotomy by Dr. von Eberts. Donor son, healthy young adult. Tests negative. Kimpton tube used, readily filled, difficulty in getting blood to flow into her veins at left elbow, no bleeding on opening vein, which was very small. Only about three ounces, or 90 c.c. trans-

fused. Slight improvement in pulse noted. Hæmorrhage came from cardiac end of stomach, likely varix. Patient did not rally after operation and died same night. No reaction noted. In females it is wiser to use the internal saphenous or jugular veins and a transfusion is better done prior to and not during another operation for obvious reasons.

CASE 2. A. D., public patient No. 1376, admitted Montreal General Hospital February 22nd, 1916. Male. Following five weeks of continuous diarrhœa and intestinal hæmorrhage, man walked in, rapidly became worse, had cedema of hands and feet, was lemon yellow, ears were wax-like, mucous membranes colourless, dyspnœic, comatose, cerebation slow, irritable and restless, enlarged liver, cough, urine 1010, albumen, no casts, hæmorrhoids present, eye discs pale, negative. Red blood cells, 1,800,000; white cells, 53,600; hæmoglobin 26 per cent. Transfusion February 25th, Donor, S., medical student, Wassermann and agglutination tests negative. Kimpton tubes used, and internal saphenous vein of patient dissected. Operation easy and patient's colour began to improve with the first tube full. At the end of the second his cheeks were pink and ears red. Beyond trouble due to patient's restlessness there was no difficulty, 525 c.c. were transfused. A few hours later the red blood cells were 1,920,000. White cells, 17,000. Hæmoglobin 26 per cent. Next day red blood cells were 3,410,000. White cells, 11,000. Hæmoglobin 23 per cent. On the 27th the patient was mentally bright, quiet, had no dyspnœa, still some cough, and had improved in every way, regaining bladder control, had incontinence before. Subnormal temperature replaced by 100°, maximum rise 101°, pulse decreased from 128 to 88. Urine shows no blood or albumen. He had slight rectal hæmorrhage with stool, and was, on March 2nd, again transfused, Donor R, medical student. Easily, rapidly, 600 c.c. at least was transfused. He rapidly improved. Two days later with spinal anæsthesia I operated on him for hæmorrhoids, which bled on the slightest touch, and he left the hospital well about one week later. His blood count, colour and strength had almost reached normal. This was a most spectacular case.

CASE 3. Private case of Dr. Lafleur, J. J. M., No. 2659. Pernicious anæmia with fever 102°, had epistaxis, hæmorrhages into retinae, from gums and intestines, dyspnœic and restless. Aged forty-two years, heavy man, extremely ill. A donor was tested and no agglutination noted. 450 c.c. was transfused about noon April 21st. During first tube full he vomited, complained of backache. Operation took less than twenty minutes. He was restless, had pain in back, and in stomach, and skin on arms was mottled where dependant. In half an hour he had a chill and temperature rose to 105° with hæmatemesis and bleeding from his gums. His wound in the arm bled and during the afternoon he vomited blood. When seen 10 p.m. he was asleep, during the night he vomited blood several times and died during the night. There was no cardiac distress, no increase in amount of cough and his colour improved in the operating room. He had suppression of urine. The donor's blood clotted readily and he was a healthy young adult male.

CASE 4. Public patient of Dr. Lockhart, No. 2239. Female, aged thirty-eight. Extreme anæmia, following abortion, bleeding up till April 14th; three days prior to transfusion; blood tests negative, red blood cells, 1,200,000; blanched, veins hardly visible, severe headache all the time. Donor was a brother-in-law and she was given 425 c.c. of blood. Her colour improved at once. Following day she had no headache and desired to be allowed to go home. Convalescence was rapid.

CASE 5. Private case of Dr. Lafleur, No. 3104, J. J. McD., admitted Montreal General Hospital May 10th, 1916, hæmatemesis, duodenal ulcer, pyloric stenosis; May 17th had free bleeding. Refused transfusion till in extremis. May 21st transfused from Dr. B., house surgeon, blood tests negative, 600 c.c. given rapidly, no symptoms during operation and no reaction. Colour and pulse greatly improved. Early the

following morning he had further intestinal hæmorrhages and died. This case had refused transfusion and operation earlier and from the size of the hæmorrhages it was clear there was arterial erosion in an ulcer base.

CASE 6. Mr. H. S., private case, Dr. Lafleur. Pernicious anæmia, severe degree; dyspnoëic; several members of the patient's family were tested and in all cases the cells of the donor were agglutinated by the patient's serum. Controls of my blood and of a house surgeon were used and finally, June 19th, he was transfused with blood from Dr. H. whose red cells were not agglutinated by the patient's serum. The reverse test was in the hurry of the work not done. A donor had been selected but on retesting a very slow reaction was obtained and he was discarded.

Vincent's tube was used and fearing trouble on account of agglutination reactions, I gave 250 to 275 c.c. very slowly. Before half the quantity was given his face and neck became suffused and he complained of pain in the head and in the stomach, this was followed by backache and an attack of retching. In an hour he had a chill with a rise of temperature above his usual range. He had no blood in vomitus, but mucous was stained and he had hæmaturia till forty-eight hours later. At this time his red blood cells were 1,600,000, white cells, 4,400, hæmoglobin 33 per cent., colour index, 1.03, and he showed typical nucleated red cells. On June 28th the patient's blood count and smears showed slight improvement and he was less dyspnoëic. An attempt in September to find another donor resulted in every case in getting agglutination of the donor's cells by the patient's serum, consequently a second transfusion was abandoned.

CASE 7. Mrs. A., public patient, Dr. Lockhart's service, No. 4015, anæmia following miscarriage, severe headache and blanched. Husband's serum agglutinated patient's cells. Daughter was used as donor. 250 c.c. of blood was used, Vincent's and Kimpton's tubes used. There was difficulty in getting the tubes to fill, daughter was a young girl. Patient showed an improvement in colour, her headache disappeared, her red blood cells increased 1,000,000 in two days, and her hæmoglobin rose from 23 per cent. to 35 per cent.

CASE 8. S., public case, No. 3801, Dr. von Ebert's service, chronic suppuration for months, psoas abscess and joint infections, staphylococcus infection, red blood cells, 1,250,000. Several donors tested, one finally found with negative tests. This donor arrived in bad shape direct from work, perspiring, frightened and made a difficult case to handle. He early became pallid, was afraid he would lose too much blood and the transfusion had to be stopped on his account. Only 250 c.c. was transfused. This improved the patient's colour and he made more rapid progress after than he had done for months.

CASE 9. Mrs. G. P. Aged twenty-two years. Second pregnancy. Admitted Montreal Maternity Hospital, September 21st, 1916. Patient had a severe hæmorrhage night before admission. She had another one of 800 to 900 c.c. the next night and during delivery, which was induced, she lost another large quantity of blood, in all probability about 1500 c.c. were lost after admission.

On the seventh day after confinement, her temperature gradually had reached 104.4-5°. On the tenth day post partum after testing for agglutination with her husband, 750 c.c. were transfused, using two Kimpton tubes, the second one being refilled. There was nothing special in the transfusion. There were no symptoms at the time, nor afterwards. No reaction of any kind took place. The most marked immediate-effect was in the colour of the patient which was obviously greatly improved. Her pulse rate, which had been ranging from 130 to 155 fell within twenty-four hours to 100 to 125. Above the latter figure it at no time subsequently rose. She was immediately and entirely relieved from severe headache, from which she had been constantly suffering since her confinement. The second day after transfusion her temperature began to drop and twenty-three days post partum and thirteen days after transfusion

it was 99°. The red blood cells before operation (done by a student) were 3,000,000, ten days after transfusion, 3,700,000. Patient's general condition was greatly improved and the transfusion was considered to be the deciding factor in the patient's fight against her infection.

CONCLUSIONS

All cases of anæmia due to hæmorrhage showed marked improvement without reactions of any kind. Even small transfusions, 250 c.c., markedly shortened convalescence and in two women enabled them to leave hospital in a week.

One case of pernicious anæmia was not greatly benefitted which agrees with other operators' experience and one was decidedly injured. The first case of the series I do not consider was helped or injured by transfusion.

The third fatal case died from fresh hæmorrhages, the transfusion certainly improved him wonderfully till this occurred.

Several possible other cases have been tested with available donors and on account of agglutination reactions were not transfused.

In Lyons, France, a public notice resulted in one hundred and fifty applicants coming forward in one week as donors. Personally we have found the difficulty in obtaining donors our greatest obstacle. The so-called "professional donor" of New York and Boston is as yet unknown in Montreal.

In conclusion I cannot do better than quote Crile's summary on blood transfusion: "Judiciously employed, transfusion will surely prove a valuable, often a life-saving resource; injudiciously employed it will surely become discredited."

BIBLIOGRAPHY

1. GEO. I. MILLER, *Long Island Medical Journal*, May, 1916, p. 189.
 2. OBOLINSKI, *Centralblatt für Chir.*, 1880.
 3. "Surgery of the Vascular System." BERNHEIM.
 4. *L'Avenir Médical*, April, 1916.
 5. A. L. GARBAT, *Jour. Amer. Med. Assn.*, 1916, p. 1543.
 6. HENRY S. SATTERLEE, *Jour. Amer. Med. Assn.*, 1916, p. 619.
 7. *Journal American Medical Association*, February, 1915.
 8. GEORGE H. MINOT, *Amer. Jour. Phys.*, 1915, p. 137.
 9. ED. W. PETERSON, *Jour. Amer. Med. Assn.*, April, 1916, p. 1291.
 10. H. F. HELMHOLTZ, *Amer. Jour. Dis. of Chil.*, September, 1915.
 11. GEORGE H. MINOT, *Boston Med. & Surg. Jour.*, May 11th, 1916.
 12. N. M. PERCY, *Surgery, Gynaecology & Obstetrics*, 1915, p. 360.
 13. RANSOM HOOKER, *Archiv. Int. Med.*, January, 1915.
 14. ARTHUR KRIDA, *Albany Medical Annals*, April, 1916.
- OTTENBURG, *Jour. Exp. Med.*, 1911; OTTENBERG and KALISKI, *Jour. Amer. Med. Assn.*, 1913, p. 2138; F. R. BARNES, *Amer. Jour. of Med. Scs.*, May, 1916, p. 727; ALAN BROWN, *CAN. MED. ASSN. JOUR.*, August, 1916.

THE TREATMENT AND MANAGEMENT OF CONGENITAL SYPHILIS *

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SYPHILIS in infants is a disease much more to be feared than is generally thought to be the case. The infection is intense, and the mortality rate surprisingly high. Particularly is this found to be the case in institutions, as for example the Foundling Home in Moscow, in which the death rate is 70 per cent. in the first six months alone. Others report a rate varying from 50 to 80 per cent., all, however, agree as to the high death rate in the first six months. It is altogether likely that these figures are rapidly undergoing a change for the better, owing to the improvement in the treatment of such cases. While statistics of any value in private practice are hard to obtain, it is unlikely that as high a death rate exists there; however, from the above figures we are able to deduct three facts:

1st. That the first six months is the danger zone in congenital syphilis, and, as a result, greater attention should be given to early diagnosis; Wassermann tests are indicated in all cases with even the slightest clinical suggestions of syphilis.

2nd. That the cases should be kept out of the institutions as much as possible, except for diagnosis and initial therapeuses; further observation may be carried on at the out-patient clinic by the physician, and in the home by the visiting nurse. The reason for this recommendation is found to be due to their great susceptibility to parental infections.

3rd. That if such cases are kept in the hospital, the greatest effort should be made to eliminate these cross-infections. This is only possible by a system which permits of the proper segregation of cases. Such an arrangement exists in the Infants' Department of the Children's Hospital of Toronto. Here what is really one large ward capable of holding sixty-five patients is divided by glass

*From the Wards and Laboratory of the Infants' Department, Hospital for Sick Children.

Read at the Annual Meeting of the Ontario Medical Association, Toronto, June, 1916.

Received for publication October 27th, 1916

partitions into a number of small rooms or cubicles which open from a central corridor, each cubicle having its own heating and ventilating system, running water and outside exposure to sunshine and air, with accommodation for three patients. No one but the physicians and nurses are permitted to enter the cubicle, special gowns being worn. Each cubicle is provided with soap, water and hand towels. On visiting days the parents see their babies through the window from an outside corridor. With this arrangement cases of coryza and broncho-pneumonia, etc., can be grouped in their respective cubicles, and so designated by red crosses on the doors. The protection afforded by such a system is well shown by the fact that of some three hundred cases of severe gastro-intestinal diseases, not a single instance of cross-infection in the form of broncho-pneumonia has appeared during the past year. Such a protection must of necessity lessen the mortality in a disease in which the resistance is lowered and cross-infection thus favoured. Besides protecting the children in this way, it is seen that the cases promptly leave the hospital after treatment in order to obviate hospitalisms. As mentioned above, the cases are watched and advised as to the feeding and general hygiene from the out-patient clinic, in conjunction with an efficient follow-up system under the Public Health nurses. In this way, then, by a cubicle system minimizing cross-infection, and secondly by a follow-up system improving home conditions, we are endeavouring to lessen the mortality in a field hitherto neglected, but promising great results.

Therapeutic measurements. Equally great strides are being made in the treatment from a therapeutic standpoint, with the advent of the arsenical salts for intravenous injection. In the old days of high mortality the treatment was largely mercurial and although splendid results were obtained, there is no doubt that greater results will come with the treatment by these salts. The preparation which has been used almost entirely in the Infants' department had been our own Canadian product, "Diarsenol".

Dosage. It has been the practice to start with 0.1 gram. When one remembers that the adult dose is 0.3 to 0.6 grams, it might appear that too large a dose was being used. Such has not proved to be the case—not one infant having shown any of the constitutional reactions so frequently found in the adult. The treatment is repeated in ten to fourteen days, and continued till a negative Wassermann is obtained.

Preparation. The dose is dissolved in about 10 c.c. of sterile freshly distilled water. The smallness of the amount allows the

use of a syringe and quicker injection of the dose, a fact of great importance in dealing with infants. In some cases, however, we have found that thrombosis has followed the injection of the stronger solution into the small vein. Owing to the smallness of the amount to be titrated a weak sodium hydrate solution is used, usually 5 to 8 per cent.—which results in a more accurate titration.

Injection. The most prominent veins in infants are usually the external jugulars, so that this vein is most often selected. For successful intravenous injection a needle of small calibre (hypodermic size), with a short, sharp bevel, gives the best results. Disappointment follows the use of poor needles, while those with a long bevel are often the cause of the vein being transfixied. The infant is controlled by being wrapped in a sheet or blanket, and held on its back on a table with the head suspended over the edge and rotated to either side in order to distend the vein. Vigorous crying fills the vein with blood, making it much easier to enter. The syringe is sufficiently large to take up the diarsenol solution and still have room to draw blood into it to prove that the vein has been entered. The solution is then slowly injected.

Should the child be too fat none of the veins will be visible. Sometimes, under these circumstances, a vein at the elbow is exposed as in transfusion. This involves considerable technique, so that the course usually adopted is to inject into the superior longitudinal sinus through the anterior fontanelle. This proceeding is not so difficult or dangerous as one might think. In the first place one has a fixed blood vessel in a definite position, with a width of not less than a quarter of an inch, usually five-sixteenths of an inch in the new-born. It has been found by experience to be more accessible than a movable vein of smaller calibre. For this purpose a needle of about 20-gauge or a transfusion needle is used. The child is held in the same position as when entering the jugular vein, except that the head is held firmly in the middle line, and slightly flexed. The operator stands at the side of, and facing the child, holds the syringe so that the needle enters the sinus from before backwards, at an angle of about forty-five degrees. The bevel of the needle is held parallel to the skin. This allows the opening in the needle to communicate with the sinus just as soon as the needle enters the sinus, besides lessening the danger of the point of the needle transfixing the sinus. The latter accident has happened once in the writer's experience, while blood was being withdrawn for a Wassermann reaction. At that time about 5 c.c. of cerebrospinal fluid was first withdrawn and then by pulling the needle back

into the sinus, the necessary amount of blood was added. The child was closely watched but no sign of irritation was noticed. It may also be added that on no occasion while using the sinus, whether it be for injecting diarsenol, or for the purpose of withdrawal of blood for blood culture or Wassermann reaction, has any unfavourable symptom appeared. Needless to say the blood is drawn into the syringe before the diarsenol is injected.

Results. At a later date it is intended to publish a list of cases treated. At present just a few remarks as to the efficiency of the drug, and some unusual reactions may be cited.

Baby F. was admitted to the infant ward with a marked syphilitic rash on the face, hands and buttocks, enlarged spleen, liver and lymphatic glands, and extreme degree of rhinitis. A class of fifth year men saw this child given 0.1 grs. of diarsenol; three days later not one of them recognized the infant, owing to the remarkable disappearance of the signs during the intervening days.

One must recall in connexion with syphilitic infants, that they frequently succumb quite unexpectedly without any relation to the giving of the diarsenol, probably due to a sudden flooding of the system with spirochaetes. One such incident happened in the ward in connexion with an infant which had just been admitted for treatment; it was in good condition but died suddenly during the night before any treatment was given.

Another type of case was that in which death followed five days after the usual injection of diarsenol, no untoward symptoms having occurred in the meantime. It may be that occasionally the diarsenol acts as a provocative dose in the adult, i.e., in liberating an overwhelming number of spirochaetes into the circulation and so causing the death of the infant. Such instances are seen only occasionally, and should in no way detract from the treatment with diarsenol, as in all probability such cases would be fatal even without diarsenol.

Summary. The prevention of cross-infection by means of the cubicle system is most important in order to reduce the mortality. This may be more efficiently accomplished outside by the supervision of all cases from a clinic, and the assistance of the Public Health Nurses. The greatest mortality is in the first six months so that early diagnosis and intensive treatment should be encouraged. Diarsenol offers the most efficient remedy from a therapeutic standpoint. The external jugular vein and the superior longitudinal sinus are the avenues by which the salt may be injected into the blood stream, so far without any untoward results.

THE MODERN TREATMENT OF SYPHILIS

BY LIEUTENANT-COLONEL L. W. HARRISON, D.S.O., R.A.M.C.

I THANK you for the honour you have done me in asking me to read a paper before your society. I have chosen the modern treatment of syphilis because apart from the fact that syphilis is the most important cause of wastage from disease which affects the Army, it is going to concern us more intimately after the War than it has done in the past, and the more generally a good idea of its management is diffused the better it will be for society in general.

At the present moment syphilis is, in England, at any rate, too much the preserve of the specialist. How often one hears a practitioner say he knows nothing about syphilis and I am afraid, not from a sense of false modesty either, he seems to take a pride in this rather than otherwise, in many cases.

I think that it is a very great pity that this should be so, as syphilis is so widespread that most of its management really falls to the general practitioner. Anyone will agree that if diseases were studied by their prevalence and effect on society in general, syphilis would take a very high place in importance. But the fact is that while the average new graduate will tell you the exact method of reaching the Gasserian ganglion and excising it, or all about the bundle of His, and its vagaries, he has the very vaguest idea as to the diagnosis of syphilis. As to its treatment, he may know that "606" or something is used nowadays, but how much to give, when to leave off, and all the other points he knows so well about remedies for many other diseases, the question merely frightens him. He says, oh, this is a specialist's game, and that is the view I am afraid he continues to hold. The result is that the average patient, whose whole future depends on a correct diagnosis and a sufficient treatment, receives some rather vague advice and ends up with taking a few pills with perhaps a dose of salvarsan at the hands of an expensive specialist until his outward symptoms have disappeared for the moment and he is tired of the treatment.

Read before the meeting of the Medical Society of the C.A.M.C., Shorncliffe, June 26th, 1916.

Received for publication August 28th, 1916.

Syphilis will continue to be the national scourge it is until it is universally studied. When it is, there will be a universal determination not to treat it symptomatically only, but to eradicate it whenever possible.

The modern treatment of syphilis is bound up now in the administration of the newer arsenical compounds which you know familiarly as "606", "914", "Galyl" and perhaps "Luargol" or "102". As you know there are three preparations of dioxydiamidoarsenobenzol or "606", viz., the original salvarsan, arsenobenzol, and kharsivan; and three of the formaldehyde sulfoxylate derivative of "606", viz., the original neosalvarsan, neoarsenobenzol, and neokharsivan. Regarding their respective merits, as far as I have been able to judge, salvarsan, arsenobenzol, and kharsivan are alike in all their effects, and I think the same applies to neosalvarsan and neoarsenobenzol. Neokharsivan is out of action for the moment and will not be re-introduced to the market until it has been freed from certain undesirable qualities. It will save time if I speak of all the available preparations of "606" and "914" simply as salvarsan, with the proviso that as I think that neosalvarsan is therapeutically not quite so active as the original preparation, I always calculate 0.9 grm. of it as equal to 0.5 grm. salvarsan.

As to galyl, as far as can be judged, its immediate effect is equal to that of the other preparations. Whether it will prove as good in the use, I cannot say at present. I fancy it will turn out to be similar to neosalvarsan. Luargol, which is a combination of "606" with silver and antimony, is on trial. I can only say that its immediate effect seems to be about twice as great as that of salvarsan since 0.15 grm. of it causes spirochaetes to disappear about as quickly as 0.3 grm. of salvarsan. If it proves to be as permanent in its effects it will supersede salvarsan, as it is much more stable and convenient to administer.

The next and most important question is the proper use of those remedies in the treatment of syphilis. How much shall we give before we say to the patient that now we can wait and let the question of further treatment depend on blood tests and results of other examinations to be carried out from time to time? It is a question about which there is much confusion at the moment. At one extreme we have the belief, which dies very hard that one or two doses of "606" is sufficient to cure any case of syphilis, and at the other we have the pessimists, who hold that salvarsan does not cure syphilis, however much of it one may give; I think neither is right, but between these extremes how shall one choose amongst

the various views which are stoutly maintained in the literature. I will not discuss all the views which have been advanced on the subject as it would take many hours to do so and we should not be much nearer the solution of the problem in the end. As a matter of fact, the very great majority of writers who have expressed their opinions on the amount of salvarsan which is necessary for the average case of syphilis, have not been in a position to judge the question properly.

They have been unable to follow up their cases systematically afterwards, and have had to trust mainly to impressions, so I hope I may be pardoned if I confine myself to a discussion of the results of some investigations carried out at Rochester Row Military Hospital before the war, and those of the German Naval Surgeon, Gennerich, who was able like us to maintain a large control of his patients afterwards and was therefore in a better position than anyone in civil practice to judge the results accurately.

When salvarsan was first introduced we commenced at the Military Hospital, Rochester Row, a systematic investigation with the object of determining the minimum amount of salvarsan, or salvarsan and mercury, which one should give to a patient before stopping and letting the question of further treatment be decided by the result of blood tests and other examinations. We were very well situated for an investigation of this kind as we were able to keep in touch with our patients for as long as they remained in the army, and we made full use of our opportunity.

The method of investigation was as follows: A given series of cases was put on a definite amount of salvarsan, or salvarsan and mercury, and when sufficient cases had been collected to enable us eventually to judge the value of this line of treatment, another series was commenced in which a greater amount of treatment was given.

NOTE 1. *Courses of treatment tested at Rochester Row before the War.* (1) One subcutaneous injection of 0.6 gm. salvarsan. (2) One intravenous ditto. (3) Two intravenous ditto at interval of two weeks. (4) One intravenous of 0.6 gm. followed by three of 0.3 gm. salvarsan at weekly intervals. (5) Three intravenous of 0.6 gm. at intervals of two weeks and four weekly calomels during same month. (6) One intravenous of 0.6 gm., nine weekly mercurial cream and one intravenous of 0.6 weekly mercurial, one of 0.6 gm., five more mercury, and one of 0.6 gm. salvarsan at end. Last course was followed by 30 per cent. relapses, chiefly serological.

Tried in France. Eight salvarsan 0.3 gm. and six mercury in a month. (2) Three salvarsan 0.3 gm. first week, two weeks interval, two salvarsan of 0.3 gm. One mercury per week throughout. Within eleven months after first course mentioned, six cases readmitted for clinical relapse out of 727 cases treated.

In this way, excluding the intramuscular or subcutaneous cases which I will deal with separately, we collected six groups of cases, in which each successive group had been treated with a greater amount of salvarsan, or salvarsan and mercury, than its predecessors. After completion of the course each case was examined monthly for clinical signs and every three months a specimen of the blood was sent for the Wassermann test to me. The results were carefully recorded against the various forms of treatment tried and summed up in the end. The investigation involved a tremendous amount of labour. We had to follow men all over the Empire with our enquiries, and I was regularly testing specimens of serum from Egypt, South Africa, Malta, Gibraltar, and even India. Altogether I should say, that not less than five thousand Wassermann tests were carried out on the blood serums of patients under observation after treatment by the courses we were testing. As I mentioned, the courses tested were progressively increasing. In the beginning a group of forty cases was treated with a single intramuscular or subcutaneous injection, but we had to abandon this form of treatment on account of the pain it caused. I mention it now only because I should like to say that I think it unfortunate that the subcutaneous method of giving salvarsan is not practicable as I believe that, dose for dose, it is more efficient than the intravenous methods. If a painless salvarsan could be found I believe that it would quickly supplant the original preparation. We adopted the intravenous method before salvarsan was on the market and eventually tested six different courses as follows:

(1) A single intravenous injection of 0.6 gm. (2) Two intravenous of 0.6 gm. at two weeks interval. (3) A full dose of salvarsan followed at weekly intervals by three doses of 0.3 gm. (4) Three full doses of salvarsan at intervals of two weeks and four injections of calomel in the same time, the course lasting a month. (5) A full dose of salvarsan, then nine injections of mercury at intervals of a week, and at the end of nine weeks another full dose of salvarsan. (6) A full dose of salvarsan, five injections of mercury in as many weeks, another full dose of salvarsan, five more mercury, and a dose of salvarsan to finish off with.

It would be too long to go into all the results in detail and I must keep to the main conclusions. Our results progressively improved and those which followed the last course which we tried, that is to say, salvarsan and then mercury, proved the best. They were disappointing, however, because although the clinical relapses had become almost negligible, the serological relapses brought recurrences within a year of the termination of the course up to something like 30 per cent. We counted as a serological relapse any place where the blood gave a positive reaction to the Stern test. I might explain here, as one always should in mentioning Wassermann tests, that I have always tested blood by the original and by the Stern modification. The original was made as delicate as I dare make it, but was never so delicate as the Stern, in fact, I would not trust the Stern test alone for an original diagnosis, as I think it occasionally gives non-specific results. I used it as a check on our salvarsan results, so as to represent them in the worst possible light.

We published our results in detail at the last meeting of the British Medical Association before the war, and there I indicated that I did not think the results were good enough, by announcing that we had already started to investigate a much more strenuous line of treatment. I might say that I had expected better results from the three salvarsan and ten mercury course and was very disappointed to find the Wassermann relapses so high.

Salvarsan has further spoiled us, however, and before I go on to speak of Gennerich's results, which must affect our future line of action, I should like to show the improvement which our three salvarsan and ten mercury course produced over the results we are getting in the pre-salvarsan period, when we had to rely only on mercury and iodides. I worked out the clinical results of mercurial treatment in three hundred cases which had been treated with regular mercurial injections, and found that over 80 per cent. had had to be readmitted to the hospital for clinical relapse within the first year. I tested the blood serum of over four hundred cases taken three months after completion of two years regular treatment by mercurial injections, and found that nearly 40 per cent. gave a positive reaction to the original test and 75 per cent. a positive to the the Stern test.

Reverting to our "606" results, one might say, "What do a few Wassermann relapses matter as one can always give more treatment as soon as the blood is found to be positive?" I think that it matters very considerably. In the first place not every

patient remains under our care long enough to allow of treatment and observation and then treatment again if necessary. What I mean is this, that one may give a patient a certain course of treatment and three months later, he may have disappeared from our control, uncured, when if the treatment had been carried on into that period of three months, the result would perhaps have been different. On that ground alone we should make the best possible effort to obtain a cure out of hand. Again, there is overwhelming evidence to show that patients who relapse, even though it be only serologically, almost always show pathological changes in the central nervous system. Whether these changes occurred so frequently in the pre-salvarsan period one cannot say. The cerebro-spinal fluid was not examined so regularly then as now, but if we may judge by the work of Ravaut they probably did. In any case there is always the risk that the relapse may show itself in the form of some disastrous lesion of the central nervous system. This is one danger of salvarsan treatment. The course is so short that after it the patient may become the prey of unrestrained spirochaetes in the central nervous system. In the old mercurial days, if under regular treatment, he was constantly taking an antisyphilitic remedy and therefore keeping the spirochaetes in check. Lastly, there is a very good economical reason and that is, that relapse cases need far more salvarsan to cure them than fresh ones, so that in the end one may find that one has used really more salvarsan per case, by giving an insufficient course in the first instance, than if this had been sufficient.

As to the amount we should give in the future, we have a guide in the results which Gennerich published early in 1914. Gennerich was situated much as we were as regards facilities for following up his cases afterwards, being a naval surgeon, and his results seem to me to be particularly trustworthy. He employs every means possible, including the systematic examination of the cerebro-spinal fluid, provocative injections of salvarsan, and regular blood tests to ascertain the results of his treatment, and his work has, very rightly I think, been largely followed in Germany. From a very early date Gennerich adopted a much more strenuous line of treatment than these which we have investigated.

NOTE 2. "*Gennerich's*. Primary cases with negative Wassermann, fifteen calomel and six to eight salvarsan of 0.4-0.5 gm. (2) Ditto with positive Wassermann, same course, followed in twenty-one days by two to three doses salvarsan. (3) Early secondary, six to eight salvarsan. If Wassermann not negative

in two weeks follow up with four doses salvarsan in thirty days from end of second course. Calomel fifteen injections at first then another fifteen after nine weeks' rest. Calomel injections commence about three weeks before salvarsan. Salvarsan given at the rate of six to eight a month, doses of 0.4 gm. being given every four or five days, and those 0.5 gm. at intervals of not less than a week. First course lasts two to three months and subsequent ones about three weeks each.

"Results reported by Gennerich. Out of ninety-two primary, one positive Wassermann after six months and two showed slight change in cerebro-spinal fluid with negative blood. Out of seventy secondary, three (treated with neosalvaran) clinical relapses, and one positive Wassermann after eight months. Period of observation not less than twelve months in any case."

His latest course was as follows: He divided his cases into four categories—(1) Early primary with negative Wassermann. (2) Primary cases in which the Wassermann had become positive. (3) Early secondary, and (4) later, i.e., recurrent cases. Early primary cases received 3.0-4.0 gm. salvarsan in six to eight injections of 0.4-0.5 gm. each, and fifteen injections of half a gram calomel in about five weeks. Primary with a positive reaction received this course and a follow up course of two to three injections of salvarsan after an interval of twenty-one days. Early secondary cases received six to eight salvarsan with fifteen calomel injections for the first course, which lasted two or three months, then four injections of salvarsan after an interval of thirty days, and two to three salvarsan injections after another thirty days. The second course calomel injections commenced nine weeks from the last calomel injection of the first course. The treatment was guided throughout by systematic examination of the blood and cerebro-spinal fluid. Recurrent cases were treated with a succession of small courses of salvarsan and mercury, and Gennerich indicated that he had little hope of permanent cure in such cases. The results in primary and early secondary cases were extraordinarily good. Out of ninety-two primary which were observed not less than one year afterwards there were only three relapses of any kind, and out of seventy early secondary cases there were four relapses. Most of those relapses would not have been detected but for tests carried out after provocative injections and examinations of the cerebro-spinal fluid.

Influenced by a comparison between our results and those of Gennerich, at the conclusion of the paper read before the British

Medical Association, which I have mentioned, we announced that we proposed to treat a series of cases on this principle: to primary cases with a negative Wassermann, eight injections of 0.3 gm. salvarsan with corresponding mercury, and to those in which the Wassermann reaction had already become positive, the same course was to be repeated after an interval of one month. We had hardly commenced this course when the war broke out and I thought that I had seen the last of venereal diseases for some time.

This was not to be. At the beginning of last year I was required to organize the treatment of syphilis from a portion of the Army under anything but ideal conditions. The problem was by no means an easy one to solve. On the other hand, experience showed that we ought to give an average of 4-5 gm. salvarsan in ten or twelve injections in a course lasting about three months. On the other hand there was the necessity of getting men back to duty as soon as possible, the shortage of salvarsan, and the shortage of medical officers to give it. As a matter of fact, I found it impossible at first to spare more than 1.8 gm salvarsan per case. After a few weeks I discovered a new source of supply and increased the course to 2.4 gm., which was given in eight injections of 0.3 gm. with six of mercury. I calculated that if this was not as much as I should like to give, it was better than any we had tried before and we should have a very small percentage of clinical relapses after it. At any rate, the amount we have was as much as the supply would stand and I had some very anxious periods on that score. Actually, the last report I received regarding this course showed that out of 727 cases that had completed it by May in last year, six had been re-admitted for clinical relapse, so that the event justified my original calculations as to clinical relapses. At the end of last year, we increased the duration of the course to seven weeks, thus: three salvarsan in a week, two weeks' interval, two salvarsan in a week, two weeks' interval, and lastly three salvarsan. The fortnightly intervals were introduced to avoid any cumulative effect as we had been getting some severe cases of dermatitis, and I thought that possibly we were piling injections so quickly one on top of the other, that we were allowing no time for the development of warning symptoms in susceptible cases before they had received an awkward amount of "606" to get rid of. We took advantage of the increased length of the course to give extra injection of mercury. I think, apart from the added dose of mercury, this is therapeutically a better course than that which lasted a month, since length of time over which the course is spread,

is a factor in the case. When the course is compressed into too short a time, a number of spirochaetes which are buried in sclerosed patches may escape, as the salvarsan cannot reach them. When it is prolonged, nature has time to open out these scleroses and the dose of salvarsan can get at them. Since my return to England I have advocated in the same time a course of injection in which the salvarsan is progressively increased and a total of 2.7 grm. given. It involves much more work, I am afraid, than its predecessor in England, but I look on it still as a compromise with war conditions and when the war comes to an end, as well as now whenever practicable, I shall advocate the giving of considerably more salvarsan than is routine at present.

No doubt from the point of view of getting men back to duty and keeping them there for a useful number of months, much less salvarsan would suffice, but we owe something to the future. The war will not last forever and all our syphilitic patients will not be killed in it. In any case, there is going to be much more syphilis in our respective countries than we had before and I think it our duty to do the best we can to get the highest possible percentage of cures. We cannot keep our patients under our care for the ideal length of time, but we can watch every opportunity of attaining the ideal. That was the principle on which I increased the course in England and recommended a blood test after fifty days. I calculated that in the case of a large number they would not be needed abroad immediately, and it would be practicable during their period of training at the bases to keep men under treatment and observation longer than is possible abroad.

There is a certain amount of risk in the course which is now advocated. Not from death in convulsions, as I think that is prevented by starting with small doses cautiously increasing, but from dermatitis and toxæmia. The percentage of this, counting every case in which the skin is at all affected, has worked out at 1.17, and the deaths were less than one per thousand of all cases. The dermatitis has not been reduced in numbers by increasing the length of the course, but the proportion of severe cases has become less. I have gone very carefully into the facts concerning those cases who died and have come to the conclusion that the only way to avoid all risk of fatality, is either to reduce the quantity of salvarsan or to increase still more the intervals between injections. To reduce the salvarsan would have the effect of increasing the number of uncured cases, and eventually, the disablement and mortality from syphilis, while the further

prolongation of the course would naturally increase the total syphilis wastage. On the whole, I think, the present course is justified at this time. We expect now to face some risk and in any case, I think we can reduce the danger of the present course, such as it is, by attention to certain points which I might mention. One great danger in cases of dermatitis is pneumonia. It seems to me that in this respect they are like burn cases. In fact some of the cases I have seen were indistinguishable from burns, and they should be protected accordingly. Two at least of our fatal cases were patients with mild dermatitis, who commenced pneumonia after a bitterly cold day with a strong northeast wind. Another feature of dermatitis cases is the stripping of intestinal epithelium which occurs and I believe this is responsible for the toxæmia, which may be a marked feature of the cases. I think it is also responsible for the irritating manner in which the symptoms ebb and flow. I believe that these patients do much better when attention is paid to the prevention of intestinal toxæmia by suitable dieting and medicine.

I am afraid I have detained you too long, and will conclude by sketching out my ideas of the treatment we should adopt in primary and early secondary cases when the war is over and we can keep our cases under our care for longer time than at present.

To primary cases, I would give two courses of 2.7 grm. salvarsan, with 9 grains of mercury in the first and 4 grains in the second, each course lasting nine weeks. The salvarsan would be arranged similarly to the course we are now using, but with intervals of three instead of two weeks, and with an interval of one month between the two courses. In these cases, I would strongly recommend an attack on the primary sore either by excision, cautery, or the energetic application of calomel ointment. I usually recommend these patients to try to rub the sore with 30 per cent. calomel ointment. To cases in whom the Wassermann reaction has become positive, I would give three such courses. The intervals between the courses should be occupied with the taking of iodides in some form. I do not think there is any danger in commencing salvarsan at once and believe that Gennerich's results would have been better if he had not wasted time with calomel injections first in these cases.

The best prognosis is undoubtedly given by early primary cases, and I would urge upon you the very great good which can be done by spreading amongst the lay public the importance of paying serious attention to all venereal sores with a view to the

earliest possible diagnosis and treatment. Needless to say, it is the duty of all doctors to whom patients apply for advice for any venereal sore, not to waste time, but to use every endeavour to make an early diagnosis.

As to the great question how long the patient should be kept under observation afterwards, and the tests which should be applied before we give him a clean bill of health, I find it extremely difficult to answer. Gennerich holds that a primary case with a negative Wassermann can be allowed to go free if he has not given a positive reaction at any time and his cerebro-spinal fluid has remained negative after provocative injections of salvarsan for a year from the end of the treatment. In cases where the Wassermann reaction was already positive when the treatment was commenced, he continues observations and tests for two years from the termination of the treatment. He instances eleven marriages with healthy offspring which he allowed within two years of infection on the strength of his treatment and negative tests afterwards. This may sound very drastic, but I think the best plan is to think out what one would require if one were oneself so unfortunate as to contract syphilis. Salvarsan is an enormous advance on former treatments, witness the comparison I made between the three salvarsan with ten mercury course and purely mercurial treatment, but it is still young and syphilis is a disease which may have terrible consequences for others, and I would recommend the greatest caution about that clean bill. I suggest in any case not less than two years' observation, consisting of regular blood tests, although I am bound to say that I have not yet seen a primary case which was negative at the end of the first year of observation, give a positive afterwards.

In conclusion I would like to say a few words with regard to a method by which there is some hope that we may be able to intensify the therapeutic action of salvarsan, and therefore reduce the amount which it is necessary to give. We have been trying the effect of injecting collosol iodine before starting salvarsan and have obtained some interesting results. In a few cases where we have injected, 100-200 c.c. collosol iodine, on one day and 0.1 grains salvarsan on the next, we have been unable to find the spirochaetes twenty-four hours after the salvarsan in action. In control cases which received simply 0.1 grains salvarsan they were if anything more numerous and their activity greater. Naturally one must not hope too much from these results at present, but you will agree that they are distinctly interesting.

An interesting discussion followed the reading of this paper and Lieutenant Colonel Harrison in his reply said:

With regard to the thrombosis caused by "luargol", it was certainly very troublesome and I thought at one time that we should have to give up luargol on this account until I hit on this plan which seems to have solved the problem. We make up the luargol so that the dose is contained in 20 c.c. which we run in from an infusion funnel. As soon as the 20 c.c. has run in we turn on the saline and run in anything from 150-200 c.c. so as to wash the vein wall thoroughly free from remnants of luargol.

Regarding the utility of having a Wassermann test on the fifty-second day, I do not think this is a waste of labour. The idea is that if the case is not cured the last dose of salvarsan may have acted as a provocative and cause a positive reaction which might not be apparent three months later. Just now we cannot keep cases longer for a blood test and I think that very probably a test on the fifty-second day is just as good as one three months later. As to the treatment of cerebro-spinal cases, I must confess myself rather sceptical as to the value of intrathecal injections. I have seen cases of cerebro-spinal syphilis improve very markedly simply after lumbar puncture without injection. On the other hand I had cases which recovered perfectly from the ordinary clinical point of view under a number of courses of salvarsan and mercury, with iodides between the courses. They were left with slight pathological changes in the cerebro-spinal fluid which intrathecal injections of salvarsanized serum failed to improve. As to the rationale of attacking the primary sore, the idea is that deep down in the sore, in the middle of areas possibly surrounded by thrombosed vessels, there may be spirochætes lying latent to which the salvarsan cannot be carried. One fears that later when that area has become organized and new vessels formed in it, those spirochætes may gain an entrance to the circulation. I think it is established that recurrences of the primary sore are much more frequent now than they were in the pre-salvarsan days. In the old days when a patient relapsed the clinical nature of the relapse was more like that which occurs in untreated cases. For instance, say a relapse occurs in six weeks, treatment having commenced in the primary stage, the relapse under purely mercurial treatment would be an early secondary manifestation, while if it occurred six months later, it would be more of the type of a late secondary, such as an ulcer on the side of the tongue. One would judge that in the case where the patient had been treated only with mercury,

the spirochaetes had been acting on the tissues all the intervening time and that the latter react accordingly, while in the salvarsan treated case there had been no spirochætal action on the tissues and they behave as if they had been invaded afresh. In other words, I think it probable that in the purely mercurial cases the latency is apparent only, while in the salvarsan cases it is real. I could give you many instances in which the manifestations of a relapse after salvarsan were an exact repetition of the symptoms which the patient showed when he first came under treatment.

It is reported in the *Edmonton Journal* that the people of Athabasca, finding it impossible to induce a medical practitioner to settle in that district, have issued a number of tickets which are being sold to residents of the district within a radius of twenty-five miles of the town and which entitle the holder to free medical attendance for himself and family during a certain period. The money thus subscribed will comprise a guarantee fund and when a sufficient amount is secured, a certain honorarium will be offered to a practitioner on the understanding that, if he accepts the offer, he is to collect no fees from patients.

THE following figures are taken from a resumé of the Annual Report of the Inspector General of Hospitals in Australia which appeared in a recent issue of the *Medical Journal of Australia*. Since the Mental Hospital at Parkside, South Australia, was opened forty-five years ago, 10,778 persons have been admitted to that institution. Of these 59.9 per cent. have been discharged "recovered". The death rate has varied between 5.2 per cent. in 1867 and 12.8 per cent. in 1903, the average percentage being 9.3. During the year 1915 there were in South Australia 2.59 insane people to every 1,000 population; in Western Australia the ratio was 3.17 to 1,000; in New South Wales, 3.79 to 1,000, and in Victoria 4.13 to 1,000.

ANTI-TUBERCULOSIS WORK IN A SMALL CITY

"THE VISITING NURSE" *

BY FRANK C. NEAL, M.D., M.R.C.S., L.R.C.P.

Peterborough, Ont.

THE subject which has been assigned to me, is Anti-Tuberculosis Work in a Small City, and the part played in that work by the visiting nurse, or sister.

I understand further that the type of city to be discussed is one without a sanatorium for the treatment of tuberculosis, one without a clinic or dispensary, one indeed without an enthusiastic interest by the majority of the people.

It is, in reality, facing the problem of beginning and developing anti-tuberculosis work, where the sole stock in trade is an overwhelming need, and a limited number of people with an interest in the work, and a knowledge of the disease.

In such places, although the need for a sanatorium is very urgent from the standpoint of the physician, still it is possible to accomplish a great deal without a sanatorium, and in fact it is a debatable question whether wisdom is shown in taking this step too quickly.

A firm foundation should first be laid so that there will be no danger of the work going back, when once started. The general public should be instructed regarding the nature of tuberculosis—the method of contagion, its curability and general treatment. From this will follow, under the wise guidance of the visiting nurse, a desire and resolve among those coming in contact with the disease to prevent and eradicate it as far as possible. Further, a philanthropic interest among those able to help from a financial standpoint should be aroused, and steps taken to impress upon the civic authorities a realization of their responsibility for a larger share in the work.

With this groundwork, it will usually be found that a demand for a sanatorium will in good time come from the people themselves; it will then be an institution which will have come to stay, and one which the civic authorities will help to support as a matter of course.

* Read before the Canadian Association for the Prevention of Tuberculosis, Quebec, September, 1916.

Received for publication September 18th, 1916.

On the other hand, if under the leadership of a few interested people, a wave of enthusiasm be created, sufficient to raise funds to build a sanatorium, without the necessary foundational work, the great danger exists that the enthusiasm may ebb and the workers find themselves with an expensive institution on their hands, which cannot be kept running because of lack of support.

And as this lack of support is merely the result of lack of knowledge, we find ourselves confronted with the absolute necessity of beginning anti-tuberculosis work by a campaign of education.

Perhaps you will allow me just here to outline for you the steps we have taken in our own city of Peterborough—a city of about 25,000—as the work there is probably fairly representative of what may be done in a city of this size.

In 1911 a few who were interested in anti-tuberculosis work formed a small organization. This was incorporated by letters patent and became known as "The Peterboro Health Association." Soon after, we became affiliated with the Canadian Association for the Prevention of Tuberculosis in order to gain advantage of their experience and secure their literature, which with other leaflets and booklets on the subject, was freely distributed. As a further means of bringing the subject before the people, prominent outside speakers experienced in such work were invited to speak before public gatherings, while local laymen addressed the congregations of the various churches along these lines, soliciting their help and interest. Advantage was also taken of the day set apart by the Provincial Government, when special instruction is to be given on this subject in the public schools, thus reaching the homes through the children.

A little later an auxiliary of ladies was formed, the members of which held a "Made in Peterboro" Fair, by means of which, together with a sale of health calendars and christmas stamps, over \$4,000.00 was realized. The educational value of this enterprise was kept in sight throughout, and in all departments of the Fair the name of the Peterboro Health Association and its aims were kept well to the front.

Having thus secured a financial start, a nurse was engaged whose services were given free to all tuberculous patients, who were willing to accept them, and on the whole a very satisfactory amount of work was accomplished.

However, this first year's work convinced the association of the inadequacy of having but one nurse, and that one given over entirely to tuberculosis work. In the first place, the old prejudice against having it known that tuberculosis exists in the home was

felt, and often people would forfeit much-needed nursing care, rather than have the neighbours see the tuberculosis nurse coming to their homes. Then, too, in her rounds, the nurse saw many general cases urgently in need of nursing care, but as her work was to attend to tuberculous cases, these had to remain neglected, and as this special nurse's visits disclosed many cases of general disease, so it was seen that a nurse doing general work would be in a position to report many cases of tuberculosis which otherwise would not be reached. Again, it was thought that if general work were done, it would be easier to gain entrance into all homes, as tuberculous patients would not feel that their disease was the only one singled out for attention.

The standpoint of the various doctors had also to be considered, and as some were not as interested in tuberculosis work as others, it was felt that more general coöperation among the doctors would be secured if there were a nurse available for general as well as special cases.

It was also felt that the time had come for a more complete organization, for although during the first period a small, carefully chosen committee was given much latitude in order to work out details of administration, it was now felt that a membership society with a small yearly fee, and a general distribution of work, would be advantageous. This would not only mean more friends and helpers, but would also bring in a substantial sum in subscriptions.

Accordingly the association was reorganized, a second nurse was appointed to coöperate with the first, and the work was put on a more practical basis by the appointment of the following committees:

1. *Finance Committee:* (a) To receive membership fees and raise money by other methods; (b) To keep proper account of finances, and prepare annual report.

The coöperation of all the other committees is required for the successful carrying on of the finance committee's work. It is wise where possible to secure the help of the nurses, as their daily contact with the patients gives the work a human interest.

As a proof that the civic authorities here are beginning to recognize their responsibility, the City Council has, during the past year, granted the above committee \$50.00 per month toward buying supplies for needy patients.

2. *The Education Committee:* (a) To procure and distribute literature; (b) To secure suitable public speakers from time to time; (c) To prepare and give health talks in schools and churches; (d) To keep facts before the public, through the press and in other ways.

In this case, the education committee is also a publicity committee and this part of the work is urgent. Stories and cartoons may be kept running in the daily papers with good effect, and bulletins also have their value. In our association, through the kindness of the daily papers, a report of the work done by both nurses is published at the end of each month. So many social activities come to the public for support and interest, that we must also present our case and abide by the verdict. With us, too, much is made of the annual meeting. Full reports are prepared, interesting lantern views shown, and some special features arranged to attract a good attendance.

3. *Supervision Committee:* (a) To have oversight of work of nurses, meeting monthly for receiving of reports and discussion of plans; (b) To have purchasing of all supplies, including nourishment, medicines, sputum cups, cots, clothing and tents where necessary; (c) To secure and maintain a room as headquarters, where supplies may be kept; (d) To keep in touch with conditions as found by the nurses in the homes they visit.

It has been said that the cornerstone upon which the most effective nursing has been built is adequate supervision, and while a committee such as the above often renders excellent service in supervision, still their time is necessarily limited, and the aim should be to put the work of the nurses under a special supervision as early as possible. If the association engaging the nursing sisters cannot do so unaided, an affiliation of various societies might together be able to afford such a supervisor.

A well-known central place should be chosen as headquarters, as this will give dignity and importance to the work and enormously increase its usefulness. Thus, under the three headings of finance, education and supervision, the work has since been carried on, and while necessarily imperfect, still much good has been accomplished, and many new avenues of usefulness have been opened up.

For example, it was found that many cases of disease in children were not being reached by either of the visiting nurses, so in the following year a school nurse was appointed by the Board of Education. Since that time there has been gradually developing a system of coöperation among the three factors—the Medical Health Officer, the School Nurse and the Health Association, whereby children reported by the School Nurse as requiring nursing care are reported to the Health Association and by it put under charge of the Visiting Nurse.

On the other hand, contacts in tuberculosis homes, and children

who should not be mingling with other children, are reported to the medical health officer and steps taken to isolate such cases.

In regard to tuberculosis among children, it is significant that more and more attention is being put upon this phase of the work, and we are beginning to see that the key to success in combating this disease lies in proper preventive work among children.

McCleave says: "It is now generally conceded that infection with the tubercle bacillus is, in the majority of cases, an incident of early life, and that regardless of the time of development of clinical symptoms, tuberculosis is, in its origin at least, essentially a disease of childhood."

Dr. Baldwin, of Saranac Lake, also says: "Childhood is the time of infection, youth the time of super-infection, and that from the extension of the primary disease."

The nature of work along preventive lines undertaken in various cities will vary largely according to local environment.

During the summer of 1914, our association made a beginning in preventive work by establishing a Day Camp for Children.

Those allowed to attend were children having inactive, incipient tuberculosis, contact cases, and those who were under-developed because of the lack of nutrition.

The site of the camp was a large, natural park with plenty of room, and with a creek running through, which afforded an excellent paddling place in warm weather. A trained nurse was in attendance, and a cook was secured to prepare the food. The children were called for in the morning by a bus, and returned to their homes in the evening.

On their arrival at the camp they were given a light lunch, then under the supervision of the nurse, they played about for a couple of hours. At noon a good, substantial dinner was served, consisting of meat and potatoes, an extra vegetable, and a nourishing dessert of some kind, with plenty of milk to drink. Immediately after dinner, the children all rested quietly for about two hours—some sleeping. The rest was taken in a huge tent with cots supplied with mattresses. Then more play was indulged in before it was time to have their afternoon lunch and go home.

Practical instruction in personal cleanliness was given by the nurse, each child being provided with a basin for washing, towel and tooth-brush. It is noteworthy that the venture was started without funds, but as it served as a demonstration of the necessity of such work, interest was soon aroused, and donations made in various ways sufficient to keep things running. On the outbreak of

the war, however, it was found necessary to suspend the work of the camp, but we are looking forward to reopening it, and also to extending this phase of the work to include open-air rooms in our schools.

However, preventive work can never reach its highest efficiency as long as advanced cases are allowed to be sources of contagion.

Francine says: "It is largely children infected by contact in their homes, who furnish later the ever on-coming crop of consumptives."

At present, in Ontario, it is the duty of physicians to report all cases of tuberculosis to the medical health officer. If this is rigidly carried out, even those cases which have no regularly attending physician should be known to the medical health officer, and steps should be taken to see that such patients are not, or do not, remain a source of contagion. In many cases, removal to institutions for their care may be necessary, or where there is no sanatorium or hospital accommodation available, the services of the visiting nurse will likely be required.

Now, before closing, just a few words as to the most important factor in all this work—the visiting nurse.

As far back as twelve years ago, Dr. James Alexander Miller wrote: "It is certainly true that a woman trained in nursing, who has the energy, interest and ability necessary for this kind of work, can do much more than any physician towards ascertaining the exact conditions of affairs, and correcting the evils existing in the homes of tuberculous patients. In no other way could this work be at all complete or satisfactory to the physician, to the patient, or to the community, and that these patients themselves appreciate this fact is evidenced by the warm reception given to the visiting nurse as a friend and welcome visitor in their homes. We consider her as an indispensable factor in the correct solution of this problem, and as a result of her efforts we can at least say that each case visited is converted from a dangerous focus of infection into a source of accurate and intelligent knowledge in regard to this disease."

Dr. Miller's summing up of the situation has been the experience of many another pioneer worker during the succeeding years.

The work of the visiting nurse has since then grown in scope and usefulness, and all other contributory factors, such as institutional care, dispensaries, educational propaganda and increased knowledge regarding hygiene and sanitation, have reached their highest point of usefulness through her coöperation.

If I were to set down from the physician's standpoint the neces-

sary requirements for an efficient visiting sister, you might say my ideals were too high, but as few enter the field for the monetary reward, it is safe to say that in the majority of those who volunteer for such work, is necessarily the first great essential—a love and sympathy for suffering humanity, a desire to better conditions and bring peace and happiness where turmoil and misery now exist. But with this sympathy must go ability, character, tact, energy and education.

Added to these womanly qualities must also be professional ones, and an untrained, unskilled worker would be next to useless. The efficiency and skill which comes from a good, regular hospital training are invaluable. But even for the woman highly endowed with splendid qualities, to which are added the professional nurses' training, there is a further education necessary to make her work most effective.

I speak of the training or experience which gives familiarity with the material with which she is to work, with the lives, character and habits of the poor in their homes, knowledge of general housing conditions, and of conditions which predispose to disease.

Further, to be able to be most successful, she should be familiar with all agencies intended to prevent or right these conditions, such as knowledge of public law, the benefits which come from schools, churches and charitable societies, and also with agencies provided for direct relief of sick, such as dispensaries and hospitals, sanatoria, etc.

Now just a word as to results. Do not expect too great or too speedy results. Some communities will respond to efforts made more quickly than others, but as sure as seed will grow in proper soil, just so sure will results be forthcoming from honest effort.

It is a rule as old as the world, that nothing is born without travail, and through toil and weariness, self sacrifice and often disappointments in such work as this, is being born the modern development of charity and medicine.

"Charity," as Dr. Devine says, "in this newer and better sense, endeavours to discover and to abolish the untoward conditions which undermine health and destroy life, which make rational living impossible and embitter honest toil, helping those who fall by the way-side, but having for its best objective point the removal of the ultimate causes of such downfall."

To coöperate in such a noble endeavour is the privilege and reward of the visiting nurse, and with such coöperation ultimate success is assured.

FALLACIES IN THE LOCALIZATION OF FOREIGN BODIES BY THE X-RAY

BY W. H. EAGER, M.D.

Captain, C.A.M.C.

THE object of this paper is not to advance any new theories regarding the location of foreign bodies but rather to point out the fallacies which occur, and the need for coöperation between the surgeon and radiologist before and at the time of operation. I must apologize for my paper which has been most hurriedly prepared, owing to the extra work incident on the opening of the x-ray department at M—— Barracks Hospital.

I shall first demonstrate the methods of localization commonly employed.

The first and simplest method is that of taking two views of the part, an antero-posterior, and lateral. This gives a rough idea of the location. I found this method necessary in a large majority of the cases which were examined in France owing to the necessity for speed on the arrival of a convoy. In fact the surgeons could hardly wait until the plate was fixed, let alone dry. In order to facilitate the finding of the body I used a rule with metal points; this left the marks on the plate, and the surgeon could see how many inches above or below a joint or mark was the projectile.

The next method of localization is by stereoscope. In this the tube is moved the pupillary distance, about $2\frac{1}{2}$ inches. Two plates are taken which, when examined in a stereoscope, give the sense of distance and proportion. It is a very useful method, in fact the best in wounds of the torso. It requires an expert to interpret the stereoscope, but when done properly one is able to say that the foreign body is within the thoracic cavity or outside, and its relation to a rib or other bony structure. The method is also of use in examination of the cranium.

The third method is the Mackenzie-Davidson or some modification of it. This method is based on the constant line of travel of the x-ray from a tube which maintains its vacuum. A plate is

Read before the Medical Society of the C. A. M. C., Shorncliffe, March 13th, 1916.
Received for publication July 13th, 1916.

used having inked cross wires at right angles to the centre of the plate. The tube is centered on the cross wires at a fixed height, 50 cm. being the usual distance, and is held in such a position that it can only move parallel to and over one of the wires. The limb to be examined is then placed on the plate and held in position. It is better to have a marker on the skin somewhere near the foreign body. The point of entrance of the *x*-ray is then marked on the skin after which one exposure is made. The tube is then moved a certain distance, 10 cm. being the best, and another exposure is made on the same plate without moving the plate or patient. In this way we secure two images of the foreign body and marker on the plate as well as the cross wires. The marks of the cross wires are left on the skin, and are made more permanent by painting over with 20 per cent. solution Argent. Nit. From the two shadows obtained we are enabled to calculate the depth of the foreign body from the plate. This is done either by calculation, logarithm scale, or by actual measurement with the apparatus which I shall show you. By this method we are able to tell exactly the position of the foreign body and were all our parts square, as cubists and futurists would have us believe, then the location of the fragment would be a very simple matter to the surgeon.

I shall now mention the fallacies, and offer a few suggestions to make the surgeon's work less arduous

Common Fallacies. The greatest difficulty which confronts the surgeon is the position of the part on which he is about to operate. Example: a patient is posed for examination with the posterior aspect against the plate, with the limb in, as nearly as possible, a true, antero-posterior position. The foreign body is near the plate. When the surgeon operates he must place the limb in the postero-anterior position which, even if exact, has necessarily caused a change in the position of the muscles. As a rule the metal is within the muscle substance and subject to movement with it. This error is particularly apparent where the metal lies in the vicinity of the shoulder girdle, where a change in the position of the arm affects the relation of all the parts.

Distortion. The *x*-rays being divergent from the focal point on the anti-cathode of the *x*-ray tube, and not parallel, distortion will naturally take place. This leads to the foreign body invariably appearing larger than normal and this is more marked the farther the metal is from the *x*-ray plate. It is also projected and never appears in its actual position unless it is directly under the principal rays of the tube. This projection may be so marked as to

throw the particle outside the limb on the plate, or, if the plate is too small, completely off the plate when there is, apparently, no foreign body present. Due allowance must always be given to this distortion when operation takes place.

Compression. As the parts are soft the weight of the part pressing on the plate makes the image appear nearer the surface than it really is.

Fallacies in the two-view method. In this method the principal difficulty is to get a true antero-posterior and lateral view, the slightest rotation of the limb will distort the picture, and give a false impression to the surgeon. I have had a box constructed which will allow of two views being taken at right angles without moving the limb. This is of especial value in those cases which cannot be removed from the stretcher.

Stereoscopic. The difficulty in actual location by this method is that actual distance from any given bony point has to be gauged by the eye of the radiologist.

Mackenzie-Davidson. The fallacies in this method are those common to all. Though the method is exact, the difficulty of operating on a round or oval body with consequent angular errors in incision is still to be reckoned with. I have here a few diagrams to show how difficult it is to keep one's incision parallel to the marking lines.

Depth. It is always to be remembered that the depth is that from the plate and not from the skin, and allowance must be made for this distance. The element of compression is most important in this method of examination as the depth given by the radiologist is that calculated while the limb is under compression. Unless the part is in the exact position in which the examination was made, or the exact reverse of that position then the error will be very great.

We now arrive at the question, how are we to overcome these errors? Errors on the part of the radiologist can only be overcome by the greatest care on the part of the expert radiologist, whose apparatus must be most exact, and carefully constructed.

Fixed positions and anatomical landmarks should be adhered to in his examination, and due note taken of them.

The radiologist should always be present at the time of operation to advise the surgeon regarding the point of incision and course to follow.

Examinations should be made shortly before operation in order that the case is fresh in the minds of both surgeon and radiologist.

The use of some apparatus in order to show the right angle lines of exposure. I have here a roughly constructed piece of apparatus which I trust to have manufactured so as to be of service.

As we are dealing with round or oval objects, and as the cranium is the most important portion of the anatomy on which we have to operate, I will detail the procedure on the part of the radiologist which I consider necessary before operation is undertaken for the removal of a foreign body. I may say that in a large number of such cases I have seen an immense amount of damage done to the brain substance without the foreign body being discovered.

The head should first be screened in order to get some idea of the location of the foreign body. An antero-posterior and lateral examination should then be made, following this a stereoscopic examination with the part nearest the foreign body next to the plate. Cross wires should be placed around the head following Reid's base line and over the head from external auditory meatus of one side to that on the other side. This gives a sense of distance proportion and location of the mass to the brain substance. After this has been done we do a Mackenzie-Davidson localization having the part nearest the foreign body (irrespective of the position in which the head had to be placed) next the plate. The point of entry of the principal ray at the first exposure should be marked in this and all cases. Thus you see I have made five plates of the head before I feel confident of the exact position. It is now up to the surgeon to find it.

I would like to mention how invaluable the needle with microphone attachment is. By its use much laceration of the part is avoided.

A MEETING of the National Executive Committee of the Patriotic Fund took place at Ottawa on December 7th, under the chairmanship of His Excellency the Governor General. It was reported on that occasion that the total contributions to the Fund up to November 30th amounted to \$16,615,778, an amount exceeding the total expenditure incurred up to that date by about three million dollars.

Editorial

ON THE SEGREGATION POLICY

WHILE it is one of the grave disadvantages of a monthly journal that matters of note may transpire and come to a head weeks before the journal can take note of them, there is the corresponding advantage possessed over the daily papers that a such monthly journal may take cognizance of these matters less hurriedly, and in a more judicial manner.

A few weeks ago Great Britain, and Canada also, were roused by a strongly worded letter published in the *Times* under the signature of Lady Drummond, protesting against the segregation policy initiated by the late Minister of Militia and Defence with respect to Canadian military patients in England. It was a well reasoned protest written with masculine directness by one who, from her position in connexion with the Canadian Red Cross, was singularly well qualified to speak with authority, and it was followed by a succession of letters in the same well-known and influential daily.

What, it may be asked, are the facts that have been brought forward, and what should be the Canadian policy in this matter? Is it the more economical and the better policy to treat Canadian military patients apart from other British military patients, in special Canadian hospitals, or is it on the whole advisable to regard and administer the Canadian Expeditionary Force as a portion of the British Expeditionary Force, and to deal out to Canadians the same treatment as is meted out to Irish, Scottish and British soldiers returned wounded to England?

There are three aspects of the case, namely, from the point of view of economy, of military administration, and of the well-being of the invalid.

For economy there is the following to be said pro and con. The system of hospitalization in England had been well worked out, each District and larger Military Territorial hospital having a system of subordinate Voluntary Aid hospitals under its supervision. But previous to the War the system had existed only on paper, and it was found that while it was put into effect with singular ease, the absence of previous experience led to very serious defects. These were not so notable in the larger Military hospitals under the charge of trained Army officers and possessing clerical staffs, but were glaring in connexion with the numerous V.A.D. hospitals. These are voluntary organizations run by groups of devoted women, local practitioners attending the patients admitted. Now the only way to keep track of patients admitted to these hospitals is by the regular forwarding of returns of admissions, transfers and discharges to the central hospitals and from these to Headquarters. It can easily be pictured how for long months the provision for such returns was more honoured in the breach than in the observance. These V.A.D. hospitals had no clerical staff; the kindly women who ran not a few of them had not the first idea either of the use or the necessity for such returns. Returns meant stamps; they regarded them as a wicked waste of time and energy and money. Thus when in 1915 Canadian patients began to be distributed about England, large numbers of them absolutely disappeared for weeks and months. The kindly V.A.D. people had taken them into their charge, they treated them with especial consideration, in fact as their very own; they petted them as they got better and thought nothing of keeping them for an extra month or two because they were Colonial cousins. In order that they might obtain full strength they sent them as convalescents to private houses throughout the country, or to local Convalescent Hospitals. The instructions to transfer them to Canadian Convalescent Hospitals were cheerfully ignored. They made no reports about these various movements: they did not answer letters

of inquiry. Presently the men were struck off the lists as deserters, only to turn up weeks later in perfect innocence, and it required unending official correspondence before they could be properly re-instated. In the meantime V.A.D. institutions sent in their monthly accounts to the district paymaster: these were returns for capitation allowance for the upkeep of the men and returns of an importance that was fully appreciated by the V.A.D. ladies, and eventually the Canadian authorities have to pay for the keep of their men for all these unnecessary weeks, not to say months.

This is one side. On the other it must be remembered that these men had been kept in already existing institutions, in hospitals, schools, public buildings, large country houses, etc., for which there is no rent to pay, that the V.A.D. nursing and much of the equipment are given voluntarily, and that thus the cost of the Canadian private in England in a British hospital is only 75 cents per diem. This is an absurdly small sum. With practically every suitable building in Great Britain already occupied, the Canadian authorities, if they carry out the policy of segregation, would have to place the majority of the Canadian patients now in Great Britain—and of late there have been 20,000 such—in hutments. The establishing of these hutments at the present cost of material would for building alone cost the Dominion somewhere near \$200.00 per bed not to mention the additional cost for bedding, equipment and service. There would thus be an initial expense of millions of dollars and at the end of the War the huts, beds, bedding, and apparatus would be thrown back upon our hands. It is safe to say that the cost of upkeep per individual would, taking everything into account, be over \$1.50 per diem. In addition there would in all probability be a heavy bill to be paid wherever these hutments were placed, for demolition, and restoration of the various properties to their original state and use. Added to this, the V.A.D. hospitals have with fuller experience come into line, and returns are now being well looked after by the

central hospitals, while so big is the strain upon the British hospital system that soldiers, British and Canadian alike, are being passed on to duty without delay. All Canadian soldiers now, when convalescent, are transferred to Canadian Convalescent hospitals, and the system is worked without friction and with thorough efficiency. It is clear that the cost to Canada of establishing separate Canadian hospitals for active treatment would exceed the cost of the system that has been in vogue up to the present. In other words the suggestion is absolutely uneconomical.

Next as to military administration. Any one who has seen the disembarkation of a great hospital ship at Southampton cannot but marvel at the celerity and precision with which in the course of a few minutes ambulance train after ambulance train draws up, is filled with patients, and departs to one or other district of England. As far as is conveniently possible, in order that they may be near their people men of Irish battalions are sent to Ireland—Scottish to Scotland, Yorkshire men to Yorkshire and so on. Up to a certain extent Canadians might be distributed to Canadian hospital districts. It is questionable, however, whether the majority of Canadian soldiers would desire this, and that because the majority, over 60 per cent. are (or were before the 4th division reached England) of old country birth, with old country connexions. They would, many of them, prefer to be near their relatives. To obtain complete segregation and to arrange that Canadian patients are sent *only* to Canadian hospitals would mean that each hospital ship must contain a sufficient number, and no more and no less, of Canadian patients to fill one or more ambulance trains for distribution to the Canadian Hospital district or districts. This idea logically carried out would mean that Canadian patients must be collected in Canadian hospitals in France. For this to be practical, there must either be special Canadian hospital ships, or periodically British hospital ships must be provided to transfer the collected Cana-

dian patients. Now for Canadian General Hospitals in France to be devoted entirely to Canadian patients, as it would seem was seriously recommended in the confidential report compiled by Colonel Bruce, must mean either that when Canadian troops move south, as they have done recently to the Somme district, then the Canadian General and Stationary Hospitals must similarly move south to some point or points along the existing lines of communication, or that the hospitals remaining where they are, Canadian patients must be brought up from the south across the main lines of communication. This is as much as to say that Canadians must have their own lines of communication separate from the British. The idea is a preposterous one. The cost to the Dominion Government of carrying it out, i. e., of establishing independent Canadian lines of communication, or of dismantling and re-appointing hospitals of 1,200 to 2,500 beds, each time that the C.E.F. moves its position, of establishing a service of Canadian Hospital ships, etc., would be stupendous. Simplicity of administration demands that the present system be maintained.

Lastly as regards the patient and his interests. Is it wise, viewed from the interests of the Canadian patient, that he should be treated along with other Canadians, by Canadian nurses and medical officers in a Canadian hospital, rather than that, as at present, the chances should be nine to one that he should find himself instead in a British hospital side by side with British Tommies, and treated by British doctors and British nurses? Here, admittedly, we encounter the greatest difficulty in coming to a decision. Upon consideration there are several quite distinct ideas, all connected, it is true, with the well-being of the Canadian soldier. If we enquire "Will he be better cared for in a Canadian or in a British Hospital?" we include in the question enquiry both as to professional treatment by doctors and nurses, and what may be termed human treatment—feeding, entertainment and companionship. If we ask

"Will he have a better time?" we similarly have in our minds ideas of bodily and mental comfort, as well as of military discipline and the wise degree of relaxation of the same. It is difficult if not impossible to weigh all these matters fully within the limits of a page or two.

This, however, may be said, that throughout the British Expeditionary Force overseas in Europe, Canadian hospitals, whether in Egypt, in Salonica or in France, have a splendid reputation: men—and officers too—of British battalions think themselves lucky to be admitted into one of them. The report has gone around that the medical treatment is of the best, the nurses splendid and not "standoffish," the food good and plentiful, and that military discipline is relaxed to a proper degree. At the seat of war the ordinary soldier has no voice in his disposition as a patient. The ambulance train bears him he knows not whither. It is not a little gratifying to us as Canadians to hear of a spontaneous cheer passing along a line of ambulance waggons filled from an ambulance train fresh from the British front upon the news being vouchsafed that their occupants were destined for one of the Canadian General Hospitals somewhere between Le Tréport and Boulogne. This, surely, does Canada no harm.

Could we promise to afford the same superiority were we to establish Canadian hospitals for the active treatment of 20,000 men in England? We doubt it. The best British hospitals in England are quite equal to the best Canadian in every respect—say to the Duchess of Connaught Red Cross Hospital at Taplow or the Ontario Hospital at Orpington. And save for specialists our best and most active surgeons and physicians seek to be, and what is more, have the influence to be, at the seat of war where they think they can be of greater immediate service. Inevitably the pick of the profession and of the nursing staff—those with the fullest military training—are at the seat of war, nor could any large proportion of these be brought back to staff hospitals in England without

on the whole doing more harm than good. The supply, that is, of officers of the Canadian Army Medical Corps of the first order, is not illimitable. Nor would the new hospitals possess the independent funds which have been donated generously to the great overseas hospitals. It is doubtful, therefore, whether what may be termed the average professional treatment accorded to our Canadian soldiers, were they segregated in Canadian hospitals in Great Britain, would be superior to what is obtainable at the moment.

Next as to comfort, entertainment and interest. There can be no question that a Canadian soldier who finds himself in a British hospital obtains more attention from the good people of the neighborhood than he would were he one of a large number in an exclusively Canadian hospital in some district in the south of England. For administrative purposes the Canadian hospitals for active treatment would have to be in groups close together. The attention lavished upon Canadian invalids under present conditions is very remarkable; the interest taken in them personally as colonials, the entertainments to which they are invited, the motor drives and other personal attentions would be almost entirely wanting were Colonel Bruce's recommendations carried into effect. It may be asked whether these attentions are good for the men? On the whole we think they are. But what we think is still better is the opportunity given to the Canadian soldier to become acquainted with men from British and other Colonial units. It must be remembered that, after all, the Canadian Expeditionary Force occupies but a very limited few miles of the Front, and that month in and month out the Canadian soldier fraternizes only with other Canadians; that at the Front he knows practically nothing save what is happening in his own particular area, and not very much about that. To mingle in the general hospitals with men of various other units gives an extraordinary education. The knowledge possessed by the ordinary British Tommy of the history of his regiment—and of the weak

points of other regiments—is very striking. Spending day after day in the general ward one learns the history of the British Army, the history of the present war, all along the front, and comes to appreciate humanity. Such a general ward affords a university education and must broaden a man in a way that it is not possible when he remains segregated with his own people. From what we learn the Canadian “Tommy” so placed is not backward in extolling the virtue of his own country and people, and in acting as an emigration agent.

There is, however, the other side of this subject. Under the old order of affairs, an isolated Canadian might easily find himself distributed to some small hospital having from a dozen to twenty beds, situated in some dreary manufacturing part of England—say one of the industrial suburbs of Sheffield or Oldham,—with no one around him having any knowledge of Canada, or interest in his home concerns and people, no one with whom to swap stories, no one having interests in common: such a man might find himself absolutely isolated and miserable. There have been such cases, but enquiries addressed to the Chaplains at the Canadian Convalescent Hospitals to which all the patients are returned—addressed, that is, to officers who come intimately into contact with the individual invalids—reveals that these cases are distinctly rare, and what is more that the men who have experience of that kind are most often constitutional grumblers who would have been discontented under any conditions. According to statements made by these Army Chaplains, the men with rare exceptions speak in the highest and most grateful terms of the treatment they have received, whether this has been in large central military institutions, or in one or other of the numerous little V.A.D. hospitals scattered throughout the land. We are convinced thus that the complaints made in the “confidential report” are greatly exaggerated.

Nevertheless we confess to sympathy with the man who

would like to see around him those who are not entirely strangers, and there is a *via media* which will do away with practically all the difficulties of the present situation. Curiously enough this is not suggested, even in the "confidential report", although it must have been well known to Colonel Bruce and his Board of Enquiry, and this is what may be termed the Australian procedure. The Australians encountered the same difficulty, and to overcome it they arranged with the War Office that Australian soldiers while distributed through English hospitals, should only be admitted in groups of six or more, thereby ensuring that none of their men should be isolated. If along with this the appointment of a band of Canadian medical inspectors be made, to visit the various hospitals caring for Canadian soldiers and to report whatever professional and other conditions are not satisfactory, the situation would be well met without its being necessary to introduce the scheme recommended by Colonel Bruce, a scheme which in our opinion is as impracticable as it is costly and wasteful. It deserves note that this system of the appointment of inspectors had been initiated by General Carelton Jones, although not carried to its proper fulness long months prior to the appointment of the Board of Enquiry.

Thus it cannot be recommended that there be further extension of Canadian General Hospitals for active treatment in England. We hold that those already in existence are quite sufficient, save that where Canadian camps are established or troops collected in England, it is quite proper that general hospitals be established for the care of the local sick among our troops. There is nothing to be said against the establishing of new hospitals at Shoreham and Brighton somewhat like the Canadian General Hospitals at Shorncliffe and Bramshott, that is, if the local accommodation be found inadequate. The Duchess of Connaught Hospital at Cliveden, and the Ontario Hospital at Orpington have been given for the use not of Canadians only, but for the whole Expedi-

tonary Force, and may well be continued along the original terms of gift.

The establishment of special hospitals for the active treatment of particular conditions of disease comes into another category. Experience has shown that not only are certain conditions best treated by experts, but also that when so treated the period of hospital detention is materially shortened, and the number of men returned to duty is markedly increased. The British authorities were somewhat slow in realizing this, and putting it into effect. If we mistake not, the first British hospital of this nature that was accepted was that for the supply of artificial limbs at Roehampton. In the meantime the D.M.S. Canadians recognized the need, and obtained the use of the Granville Hotel of Ramsgate, the one hotel on the south coast thoroughly equipped as a hydrotherapeutic institution, establishing there a special hospital for the treatment of cases of bone, joint, and nerve cases. That hospital has been a pioneer institution, a remarkable success and a model for the British hospitals of the same order subsequently established at the Depot camps. At the same time there was established the Westcliffe Canadian hospital for eye, ear and throat cases. That, again, has filled a very distinct need. It has in fact been so successful that the British authorities are, we understand, about to establish similar institutions. The same need led to the establishment of special hospitals for venereal cases, and for rheumatoid and allied conditions at Elham and Buxton respectively. Such hospitals fill definite needs, are manned by experts, and we think nothing can be said against expanding this policy. They have a very definite *raison d'être* which cannot be said to exist in the case of the ordinary general Canadian military hospital.

MEETING OF THE ONTARIO MEDICAL ASSOCIATION

THE thirty-seventh annual meeting of the Ontario Medical Association will be held at Toronto from May 30th to June 1st, 1917. The officers are as follows: President, Dr. A. Dalton Smith, of Mitchell; Secretary, Dr. F. Arnold Clarkson, and Treasurer, Dr. J. H. Elliott, of Toronto. Judging by the amount of work already accomplished by these energetic officers and the various Chairmen of Committees we may safely predict a meeting of more than usual interest.

Dr. Babcock, of Philadelphia, will deliver the address in surgery; in medicine, Dr. Christian, of Boston; in gynæcology, Dr. Chipman, of Montreal; and in nose and throat, Dr. McHenty, of New York. Dr. Balfour, of Rochester, has also promised to be present. These are all well-known men and there need be no assurance from us that those of our members who attend the meeting will be amply repaid.

MEDICAL INSPECTION OF SCHOOLS

ORGANIZATION, economy, efficiency, are watchwords to-day in all civilized countries as never before in the history of mankind. Among the belligerent nations it was recognized early in the present struggle how essential these are in all that pertains to military and naval affairs, and in those utilities and industries which serve them. With the enormous expenditure entailed by the war; the decreased production, the resulting high cost of living and increasing taxation, it has been found necessary to apply the same principles in a wider sphere to include the resources and activities of the nation as a whole. The necessity will be even more urgent in the economic struggle which all thoughtful people recognize must follow the war.

The interest taken in recent years in child hygiene natur-

ally led to medical inspection of schools, and is evidence of an awakening to the national importance of conserving as far as possible the mental and physical well-being of children, upon whom the future of the nation depends.

In carrying out this commendable work a conflict of opinion has arisen as to whether Medical Inspection of Schools should be under the Boards of Health or under the School Boards. The latter in many instances were first to recognize its importance and to take the initiative, resulting later in a dual control, when progressive Boards of Health became alive to their responsibilities on the question of child hygiene.

In the administration of any work, dual control is unsatisfactory. The question therefore arises, is medical inspection of schools primarily an educational or a public health question? Sir George Newman, the eminent British authority, says, "that the problem is no longer debatable, that from the standpoint of efficiency and economy, medical inspection of schools should be under the control of the Medical Officers of Health." This is the rule which obtains in New York, Chicago, Philadelphia, Boston, Baltimore, Cincinnati, Pittsburgh, Buffalo, Detroit, and other great American cities. The fact that Boards of Health, when properly organized, have the necessary administrative machinery, that Officers of Health have special training and experience in overseeing work of this sort, that medical supervision and inspection are equally important in their application to children *under school age*, that the work should be carried on throughout the whole year and not become inoperative in holidays, are all additional and convincing arguments in favour of school inspection being placed under the control of the Public Health authorities. This undoubtedly would be the more economical plan, and we are convinced would increase the efficiency of the work. It is therefore highly desirable that the provincial legislatures should enact legislation where necessary to place control where it properly belongs.

At the third annual convention of the Women's Institute of Western Ontario, a resolution was passed asking that a special grant be set aside by the provincial government for the purpose of providing more careful medical inspection of children in rural schools, and that further action be taken as regards the feeble-minded and the prevention of admission to this country of feeble-minded immigrants.

In the province of Manitoba a dairyman was recently fined fifty dollars for selling watered milk, the prosecution being conducted under the Public Health Act which provides that there shall be no appeal from any conviction under the Act. However, an appeal was brought before the provincial Court of Appeal on the ground that it was *ultra vires* for the Legislature of Manitoba to attempt to set standards for milk or cream, since such a right belonged exclusively to the Dominion Government. The Court refused the appeal, declaring that it had no jurisdiction in the matter.

THE business premises and plant of the Sanatogen Company at Penzance, Cornwall, and in London, have been disposed of by the British Government. As is well known, the Sanatogen business was a German undertaking and the immense profits all found their way to Germany. The matter was taken up by the British Government soon after the beginning of the war, but it was not until last September that the business was finally purchased by a group of British business men.

SIR CHARLES WAKEFIELD, Chairman of the British National Committee for Relief in Belgium, has issued an urgent appeal on behalf of two million, five hundred and seventy-five children held captive by the Germans in Belgium, the majority of whom for over two years have been kept alive by the humane intervention of the Neutral Commission for

Relief in that country. As a result of underfeeding, tuberculosis is increasing rapidly among the whole population and rickets is becoming epidemic among young children. The truth of this is borne out by the report presented by Dr. William Palmer Lucas, professor of pædiatrics in the University of California, who was sent by the American Belgian Relief Commission to study health conditions in the conquered part of Belgium. Professor Lucas states that the increase of tuberculosis seems to be mainly a result of lowered vitality due to underfeeding, that every sanatorium is overcrowded with patients and that the waiting lists for admission to these sanatoriums is rapidly increasing. On the other hand, infant mortality has decreased, a fact due to its having been the object of great solicitude since the beginning of the war.

As a result of negotiations taken up with the belligerents by the Swiss Federal Council, and the intervention of the Pope on behalf of prisoners in German camps, an arrangement was made some time ago by which prisoners in Germany who were suffering from tuberculosis or other disease and who were not hopelessly incurable should be interned in Switzerland. The first convoy of French and Belgian sick arrived at Leys on January 25th, 1916, and the first of the British prisoners reached Zurich on May 29th. Since then other convoys have arrived at Montreux, Montana, and other places. The prisoners are distributed in hotels according to their nationality. The *chef d'établissement* is an interned non-commissioned officer and the establishments in each district are under the orders of a *chef de secteur*, who is responsible to the Swiss medical officer; Colonel Hauser, physician in chief of the Swiss Army, directs the whole service. Everything possible has been done to ensure the comfort of the men and to provide them with suitable occupation. Club rooms have been provided where the men may meet and where non-alcoholic drinks are supplied at the lowest prices. Workshops have been opened in

some places, a circulating library has been established, and a series of lectures arranged during the winter months. Arrangements have also been made to admit interned students to the Swiss universities.

THE American Society for the Control of Cancer was formed at the ninth meeting of the Congress of American Physicians and Surgeons, which took place in Washington, in May, 1913, and has now published a report of its activities during the three years ending May, 1916. The purpose of the Society is to institute a campaign of public and professional instruction in the symptoms, diagnosis, treatment and prevention of cancer, and to collect statistical data concerning the disease. During the period covered by the present report, the Society has enrolled 577 members and contributors, approximately half of whom are physicians. Branch committees have been formed in sixteen States and the coöperation has been obtained of a number of medical journals, medical societies, individual members of the profession, nurses, social workers, women's clubs, insurance companies, industrial and welfare organizations, and newspapers. Special articles, statistics, lectures and data of all kinds concerning the disease, are prepared by the Society and are distributed to various agencies, and public meetings have been arranged at which experts discuss the different phases of the problem. In order that the most complete statistics may be obtained, a Statistical Advisory Board has been appointed including among its members thirty representatives of organizations that were already interested in the subject. Through the coördination of all these agencies, the Board will be in a position to conduct investigations upon a larger scale than otherwise would be possible. The subject of cancer mortality has been taken up with the Director of the United States Census, and upon the suggestion of the Society a special report on the mortality from the disease during 1914 has been prepared and will be published very shortly.

Canadian Medical Association

SINCE the last number of the JOURNAL appeared considerable progress has been made in the work of preparing for the coming meeting in June, 1917.

The address in medicine will be given by Dr. Theodore C. Janeway, of the Johns Hopkins Hospital, Baltimore, and while no selection has yet been made for surgery, the names under consideration make it certain that a splendid address may be anticipated.

The committees in charge of the various sections are in communication with prominent specialists and laboratory workers throughout Canada and the United States, so that those taking part in the special branches may look forward to interesting papers and discussions.

The social side of the meeting will not receive the same amount of attention as at former meetings, as it is felt by the Executive that this should be largely a business and scientific meeting. At the same time one or two functions at which the members may get together and renew old acquaintances are being planned.

THE medical curriculum has been shortened to four years and eight months in all Australian universities for the duration of the war in order to increase the number of graduates in medicine to meet the military and civilian requirements.

Miscellany

Book Reviews

S. WEIR MITCHELL, M.D., LL.D., F.R.S., 1829-1914, MEMORIAL ADDRESSES AND RESOLUTIONS. Philadelphia, 1914.

To have emerged at the end of a long life of usefulness, to have ridden over all the disappointments and trials of daily happenings, and, notwithstanding all the anxieties personal and professional of an existence so varied as that of the late S. Weir Mitchell, yet to be able to produce such happy and uplifting Essays collected in this delightful volume, is a record that falls to the lot of few men in active work in any of the professions. It is difficult to express what the world at large owes to S. Weir Mitchell, but this may well be said, that his memory will be ever green in the work before us, recalling on every page a very charming personality. R. W. P.

COLLECTED PAPERS ON ANALYTICAL PSYCHOLOGY. By C. C. JUNG, M.D., LL.D., formerly of the University of Zurich. Authorized translation edited by DR. CONSTANCE E. LONG, Medical Officer, Education Board. 392 pages. Publishers: Baillière, Tindall & Cox, 8 Henrietta St., Covent Garden, London, 1916. Price 12/6 net.

THE papers constituting this volume are chiefly lectures delivered in Great Britain and America, together with a few reprinted articles arranged chronologically. They embrace a variety of subjects, such as the psychology and pathology of the so-called occult phenomena, the psychology of rumour, psychoanalysis, the psychology of dreams, the content of psychoses, and cognate matters—all in the field of the newer psychology which is in the making. Those who have followed this later trend of thought, beginning especially in the work of Freud, will not need to be told that Jung's thinking is critical and original, and it may please those antagonistic to Freud's views to know that Jung disagrees with the Vienna school in certain fundamental conceptions, being "synthetic and prospective" rather than "analytical and causal merely.

The latter, at least those of them who desire enlightenment, can profitably read this collection of masterly writings. The method of presentation is most eminently fair and scholarly, and is characterized by a careful balance of statement, well exemplified in the correspondence with Dr. Löy here published. This is as it should be; most so when the materials of study are found in the realm of the unconscious—which is the quaking foundation of individual mental life. To many the unconscious is a fearsome thing. But the fact is established that therein lie the hidden springs of many actions and behaviours, and if we are to know ourselves, fearless study must be undertaken. Dr. Constance E. Long, to whose care has been intrusted the editorship of the volume, well says that "we must learn to use this knowledge and in using it to submit to its own laws."

The book will be a necessary part of the library of every neurologist.

THE PROBLEMS OF PHYSIOLOGICAL AND PATHOLOGICAL CHEMISTRY OF METABOLISM. For Students, Physicians, Biologists and Chemists. BY DR. OTTO VON FURTH, professor extraordinary of applied medical chemistry in the University of Vienna. Authorized translation by ALLEN J. SMITH, professor of pathology and of comparative pathology in the University of Pennsylvania. 667 pages. Philadelphia and London, J. B. Lippincott Company, 1916.

THE translation of this book will be welcomed by all those who have at heart the welfare of biochemistry and its applications to medicine. The book is more than a mere compilation of facts, which the medical student or the practising physician reads, and remains at the end almost as wise as he was at the beginning; a statement which unfortunately can be made of many text-books on this subject. As such it fills a distinct gap in the English literature. It presents metabolism as a connected subject. It shows the practical bearing of biochemistry, not merely as a series of diagnostic tests, but as an attempt to unravel the mysteries of human metabolism, and so lead to a clearer and more rational treatment of disease. This is admirably shown in the chapters on purine metabolism. It also emphasizes the importance of thorough research, not only by the chemist and the physiologist, but by the medical man, and in this connexion, indeed, von Furth has some severe strictures to lay on certain types of original work.

Like all translations the book suffers a little in not being quite

up to date. The date of the German edition is not given, but judging by the references is 1912. It is unfortunate, too, that the translator has made several mistakes in chemical nomenclature. Thus "nitric" is written for "nitrous" (p. 120); pyruvic acid is called "racemic acid" (p. 460); d. galactose (dextro-rotatory) is given as " δ galactose," which would be an entirely different, and as yet unknown, form of that sugar (p. 290), etc.

These mistakes, however, do not mar the value of the book and we can recommend it to all those who wish to gain a generalised knowledge of this branch of chemistry and medicine. The value of the book is increased by numerous references to the original articles.

INFECTIONS OF THE HAND: A GUIDE TO THE SURGICAL TREATMENT OF ACUTE AND CHRONIC SUPPURATIVE PROCESSES IN THE FINGERS, HAND AND FOREARM. BY ALLEN B. KANAVEL, M.D., assistant professor of surgery, Northwestern University Medical School, Chicago. Third edition; thoroughly revised. 498 pages with 161 illustrations. Lea & Febiger: Philadelphia and New York, 1916. Price \$3.75 net.

Kanavel's book deserves not only this third edition but many other editions. It has been very favourably reviewed everywhere and deserves every commendation. It is a model of the monograph. In the present edition the author has taken the opportunity of adding two chapters, the first upon the relation of acute infective processes to industrial pursuits, and the second upon plastic procedures instituted for the correction of deformities. The great part of the first of these appears to have been written by Dr. Mock, in collaboration. It sets forth briefly the enormous importance from the economic standpoint of the early and thorough treatment of the minor injuries to the hand in workmen. Statistics are given indicating the very great loss in time and in working power resulting from the infections of these minor injuries when neglected.

The work of Dr. Mock, and of a few other surgeons whose work lies largely in industrial concerns, has of late years made it evident to employers how important it is to guard against the numerous external causes for accidents found in working places. These men have been largely responsible for the spread of the "safety first" movement through America and Canada, a movement which has done so much to lessen accidents.

Dr. Mock is very strongly in favour of hospital treatment even

for small injuries as against ambulatory treatment, and proves his point by an appeal to figures.

The second chapter, added to the present edition, concerns Dr. Kanavel's experience in plastic operations for those serious late effects of hand infections, particularly atrophy and contracture of muscles, ankylosis of joints and involvement of arteries and nerves in scar tissue with secondary atrophic changes. On the whole his results in these desperate cases have been most encouraging. Considerable improvement was secured particularly by transplants of fat about tendons, nerves, and into the space left by the excision of the carpal bones.

There is also to be noted a distinct improvement in many of the illustrations. In conclusion one can only advise most strongly all medical men who have anything to do with hand infections, to buy this book and to study it carefully. There are few things so frequently mishandled as these infections, and there can be but few practitioners who will not profit by a study of the book.

THE ART OF ANÆSTHESIA. By PALUEL J. FLAGG, M.D., lecturer in anæsthesia, Fordham University Medical School, anæsthetist to Roosevelt Hospital. 341 pages with 136 illustrations. Philadelphia and London. J. B. Lippincott Company, 1916. Price, \$3.50.

Dr. Flagg's book is entitled *The Art of Anæsthesia*. This is not to say that the scientific side is altogether neglected, but essentially it is a book which goes particularly into the detail of the anæsthetic art. It is intended to instruct the student and the graduate how to give anæsthesia pleasantly and safely. All forms of anæsthesia as practised to-day are well described, and in so far as it is possible to give instruction in anæsthesia Dr. Flagg does it.

There is at the beginning a good, though short chapter on the history of anæsthesia in which due credit (so long delayed in the paying) is given to Crawford Long for his discovery of ether. The administration of ether is, as is right, described most fully, that being nowadays our standard anæsthetic.

Chloroform is judged severely on account of its dangers of sudden death and chloroform poisoning, now so well known; but no mention is made of the various apparatuses, such as the Vernon Harcourt, for giving low percentage chloroform, the results with which have been so very much better than with the ordinary administration.

The chapters on intra-tracheal and intra-pharyngeal ether are well done and up to date; and the same may be said of the chapter on gas-oxygen anaesthesia. The author makes the very just observation that in the combined gas-oxygen plus local anaesthesia, the local is decidedly the more important of the two. He also points out the value, and indeed the frequent necessity, of the addition of ether to the ordinary anoci-association technique of Crile.

The chapter on regional anaesthesia is far too short considering its growing importance. The theory of anaesthesia, by which we mean the physiological and pathological side of the subject, is not in this volume discussed at any length. That, however, belongs more to the science of anaesthesia which this volume does not propose to discuss at any length. In conclusion, the book may be heartily recommended to students and to beginners, though it contains many hints also which may be of value to the professed anaesthetist.

Books Received

THE following books have been received and the courtesy of the publishers in sending them is duly acknowledged. Reviews will be made from time to time of books selected from those which have been received.

PHARMACOLOGY AND THERAPEUTICS. BY HORATIO C. WOOD, JR., M.D., professor of pharmacology and therapeutics in the University of Pennsylvania. Second edition. Publishers: J. B. Lippincott Company, Philadelphia, London and Montreal, 1916.

SYPHILIS. BY LOYD THOMPSON, PH.B., M.D., physician to the syphilis clinic, Government Free Bath Hospital. 415 pages with 84 illustrations. Publishers: Lea & Febiger, Philadelphia and New York, 1916. Price \$4.25 net.

PHYSICIAN'S VISITING LIST FOR 1917. Sixty-sixth year of its publication. Publishers: P. Blakiston's Son & Co., 1012 Walnut St., Philadelphia.

A MANUAL OF CHEMISTRY. A Guide to Lectures and Laboratory Work for Beginners in Chemistry. A Text-book specially adapted for Students of Medicine, Pharmacy and Dentistry. BY W. SIMON, PH.D., M.D., late professor of chemistry in the College of Physicians and Surgeons of Baltimore; and DANIEL BASE, PH.D., professor of chemistry in the Maryland College of Pharmacy. Eleventh edition, thoroughly revised. 648 pages with 55 illustrations. Publishers: Lea & Febiger, Philadelphia and New York, 1916. Price \$3.50 net.

THE BIOLOGY OF TUMOURS. BY C. MANSELL MOULLIN, M.A., M.D., F.R.C.S., Lt.-Col. R.A.M.C.; consulting surgeon to the London Hospital. Publishers: H. K. Lewis & Co., Ltd., 136 Gower St., London, W.C., 1916. Price 2/6 net.

Obituary

ANDREW ROBERTSON GORDON

DR. A. R. GORDON died at his residence, 73 De Lisle Street, Toronto on Sunday, December 17th, 1916, after an illness which lasted for more than a year.

His death at fifty-three years of age will be a source of keen regret to his many friends. He enjoyed the confidence of a large number of the citizens of Toronto who sought his service as physician and his ability as a teacher won the admiration and respect of the many students who of recent years have passed through the University of Toronto in the Faculty of Medicine. Patients, students and colleagues at the University will mourn his loss and have heard of his death with great sorrow. None will grieve more sincerely than his former fellow officers at No. 4 Canadian General Hospital with whom he went on active service abroad in May, 1915.

Dr. Gordon graduated in medicine from the University of Toronto in 1890. He was eminently successful in his profession and acquired a very large practice: of late years he restricted himself to the work of a consulting physician, specializing more particularly on diseases of the heart. He had worked with Sir James Mackenzie, for the better part of a year, in the study of cardiac disease and it was his intention to devote his energies exclusively to that department of medicine.

In 1903 Dr. Gordon was appointed Associate-Professor of Clinical Medicine in the University of Toronto and held this appointment at the time of his death. He was an excellent clinician and exhibited exceptional ability as a teacher in the medical wards of the Toronto General Hospital, on the staff of which he was senior assistant physician. The students of the University of Toronto appreciated his worth: they have lost a true friend whose teaching was characterized by rare qualities of accuracy, efficiency and thoroughness.

Shortly after the Great European War broke out the University of Toronto offered a Base Hospital for service in the field, officered by members of the University staff. Dr. Gordon was among the first to volunteer for duty and, with the rank of Lieutenant-Colonel, was attached to the staff of the Hospital which became known as No. 4 Canadian General Hospital, now doing duty at Salonica. After the necessary preliminary training in Canada he sailed with this unit for England, but was invalided home because of the serious nature of the illness which manifested itself when he was on active service. The loss of his services in this hospital was greatly felt and it was with keen regret his fellow officers parted with him at Shorncliffe.

He was a most agreeable colleague, a man of an affectionate nature, with broad sympathies combined with exceptional professional ability. The profession has lost in the death of Dr. Andrew Gordon a man who will be greatly missed in many walks of life.

We wish to extend to his widow and family our most sincere sympathy.

LIEUTENANT STANLEY ARTHUR WALKER, R.A.M.C., whose death occurred in action on October 15th, last, was medical officer of the 12th Cheshire Regiment, and at the time of his death had been in France for about seven months. He was a son of the Reverend George Walker of Toronto and was in his twenty-seventh year. He graduated from the University of Toronto in the spring of 1915 and became house surgeon at the Toronto General Hospital, a post he relinquished in November of the same year when he went overseas to join the Royal Army Medical Corps.

DR. CHARLES RICHARD CHARTERIS, of Chatham, Ontario, died suddenly from heart failure on November 25th. Dr. Charteris was born at Chatham in 1865 and graduated in medicine from Vic-

toria University, Toronto, in 1887. After spending two years in the hospitals of Edinburgh and London, Dr. Charteris began to practise at Florence, Ontario. In 1897 he left Florence for Chatham where he continued his professional work up to the time of his death. In addition to being medical officer of health for Chatham township, he was physician to the county jail and county house of refuge. Dr. Charteris was also at one time president of the Ontario Library Association. The loss of Dr. Charteris will be keenly felt in Chatham and the surrounding district and as a mark of appreciation of his faithful service throughout a period of almost twenty years, the following memorial of condolence has been presented to his family by the Kent County Council:

"Whereas it has pleased Almighty God in the dispensation of His Providence to remove by death the late Charles R. Charteris, M.D., who for upwards of thirteen years was a faithful and loyal official of the County of Kent, being its physician of the House of Refuge and Jail Surgeon.

"The members of the County Council desire to give expression to their high appreciation of the late Dr. Charteris, his gentlemanly bearing, his devotion to duty, his unselfish services and his high code of honour and to place on record their sense of the great loss this county has sustained by his early death and to convey to his wife and family the sincere sympathy of this council in the great affliction which has so suddenly become theirs to bear."

MAJOR R. K. KILBORN, M.D., died at Kingston on December 3rd. Major Kilborn had been in poor health for some time and last February was obliged to give up his duties as medical officer of the Royal Military College, a position which he had held for seventeen years. Dr. Kilborn was born at Frankville, Ontario, and graduated from the medical college of Queen's University in 1879. He practised at Toledo until 1891, when he became medical superintendent of the Kingston General Hospital. In 1896 he returned to general practice in Kingston and in 1899 was appointed medical officer of the Royal Military College.

DR JAMES DORLAND died suddenly on December 10th, at Adolphustown, Ontario, where he had been in practice since 1905. He graduated from McGill University in 1875 and subsequently practised in Milwaukee and Chicago. He was born at Adolphustown and was in the sixty-sixth year of his age. His only son, James P. Dorland, went overseas with the First Canadian Contingent and is still at the front.

DR. WARREN KILBORN, of Sharbot Lake, whose death occurred in December, was born at Frankville, Ontario. He graduated from the Eclectic Medical College, Philadelphia, in 1866 and had been in practice at Sharbot Lake for almost fifty years.

News

MARITIME PROVINCES

DR. DAVID W. MCKENZIE, associate urologist of Bellevue Hospital, New York, has been appointed urologist-in-chief of the Royal Victoria Hospital, Montreal. Dr. McKenzie is the son of Mr. Finley McKenzie, of Flat River, Prince Edward Island. He graduated in Arts from Dalhousie University in 1900 with honours in pure and applied mathematics, and in medicine from Cornell University in 1904.

DR. W. W. WHITE, ex-president of the New Brunswick Medical Society, was the guest of honour at a dinner given by members of the profession at St. John on Thursday, December 14th, on the occasion of his fifty-fourth birthday.

ONTARIO

THE following is the list of infectious and contagious diseases issued by the Provincial Board of Health for the month of November: Smallpox, 1 case; scarlet fever, 85 cases; diphtheria, 467 cases, 28 deaths; measles, 515 cases, 9 deaths; whooping cough, 91 cases, 4 deaths; typhoid, 74 cases, 11 deaths; tuberculosis, 132 cases, 56 deaths; infantile paralysis, 10 cases, 2 deaths; cerebro-spinal meningitis, 8 cases, 4 deaths.

It has been decided to rebuild the west wing of the Western Hospital, Toronto, and the plans for the new building are under preparation.

It was unanimously resolved at a recent meeting of the St. Thomas Board of Education that the school nurse be empowered to make the necessary arrangements for operations on children suffering from adenoids, polypus, or enlarged tonsils, if the parents were unable to afford the expense, such operations to be performed at the Amasa Wood Hospital by the resident doctor free of charge.

DR. LOUISE A. PENNINGTON, of Ottawa, has been appointed house surgeon to the Wolverhampton and Staffordshire General Hospital at Wolverhampton, England.

OWING to ill health, Dr. Boyd has been obliged to give up his duties as medical superintendent of the Kingston General Hospital.

A FIRE broke out at Grace Hospital, Toronto, on November 28th. At the time one hundred and fifteen patients were in the building. As the fire spread rapidly from the cellar where it originated, it was only with great difficulty that the patients were removed to a place of safety. Both nurses and firemen, however, acted splendidly and every patient was safely removed from the building and sent either to another hospital or to his residence. The hospital was not destroyed but a good deal of damage was done by the smoke and water.

DR. C. J. O. HASTINGS, medical officer of health of Toronto, has been authorized by the Board of Control to conduct an investigation into the high cost of living.

DR. J. B. MARTYN, of Alvinston, Ontario, has sold his practice to Dr. T. A. Brandon, formerly of Watford, Ontario.

DR. R. W. GLIDDEN has gone into practice at St. Thomas, Ontario.

QUEBEC

THE first Jewish Maternity Hospital to be established in Montreal was formally opened on November 17th. The building has sufficient accommodation for twenty patients.

SASKATCHEWAN

A MUNICIPAL hospital with accommodation for twenty-five patients is to be established at Kerrobert to serve the rural municipalities of Mariposa, Oakdale, Progress, Heartshill, and Kerrobert.

BRITISH COLUMBIA

Two members of the medical profession are included in the Cabinet recently formed by Premier Brewster. Dr. J. H. King, the Minister of Public Works, is a New Brunswicker by birth and a son of Senator G. G. King. He graduated from McGill University in 1895 and has been in practice at Cranbrook. Up to the time of the recent election, Dr. King was chief whip of the Liberal party in British Columbia. Dr. John D. MacLean, Provincial Secretary

and Minister of Education, is also a graduate of the Medical School of McGill University (1905) and is a native of Prince Edward Island. He has been practising at Greenwood, British Columbia.

MEDICAL COLLEGES

Toronto University

LIEUTENANT FRANCIS CARL HOWARD, who died at Frankfort, Germany, on September 9th of wounds received in action on that day, was a student in medicine at the University of Toronto. He was the son of Mr. Lewis Howard, of Toronto.

THE degree of M.B. was conferred upon the following successful candidates by the Medical Faculty of the University at a special convocation which took place on December 11th. The majority of these graduates have already enlisted for active service.

James Franklin Adams, Hanover; Frederick Grant Banting, Alliston; William Wray Barraclough, B.A., St. John, New Brunswick; Henry Norman Bethune, Toronto; Thomas Wilmot Bleakley, D.D.S., Kindersley, Saskatchewan; Frank Herbert Boone, Toronto; Arthur John Boyce, B.A., Goderich; William Easson Brown, Toronto; Beaumont Sanfield Cornell, Athens, Ontario; Daniel Irwin Davis, Port Coquitlam, British Columbia; Gordon Murray Dobbin, Toronto; John Sutherland Douglas, Dunnville; Hugh Alexander Elliot, B.A., Midland; Charles Farquharson, Agincourt; Douglas Gordon Findlay, Toronto; Donald Roderick Finlayson, Lucknow; Charles Elias Frain, Norwich; Ruggles Kerr George, B.A., Toronto; Joseph Appelbe Gilchrist, B.A., Toronto; Malcolm George Graham, Rodney; Albert Robert Hagerman, Parkland, Alberta; Roy John Hardstaff, M.D., West Devonport, Tasmania; Frederick William Watts Hipwell, Alliston; Edgar Duncan Hutchinson, Sarnia; William George Jamieson, Camborne; Andrew Murray Jeffrey, Toronto; Frederick Macnab Johnson, St. Thomas; Wilfred Joseph Johnston, Craigvale; Cecil Vernon Mills, Corunna; Harold Alexander Mitchell, B.A., Vancouver; Albert Montgomery, Toronto; Hector Clive McAlister, Ridgetown; James Clarence McClelland, Toronto; John McWilliam McDonald, Lakeside; Charles Spurgeon Macdougall, Kincardine; Angus MacKay, Woodstock; Robert MacKinlay, Aberarder; Fred Schlenker Parney, Edmonton, Alberta; Thomas William Parker Peacock, Stroud, Ontario; George Raymon Scott, Peterboro; Wilmot Edward Lenox Sparks, Toronto; William Pelton Tew, Oil Springs; Newton Oscar Thomas, B.A.,

St. Thomas; Charles Everett Thompson, Hamilton; Arthur Thompson, M.A., Toronto; Hugh Duncan Veitch, Winterbourne, Ontario; Thomas Esmond White, Hamilton.

McGill University

THE sum of \$15,000 has been given to McGill University by Dr. James Douglas of New York. It is the intention that part of this money shall be placed in an endowment fund for the publication of a series of reprints of original papers from the pen of members of the staff of the different faculties in the University. The publication of such reprints was discontinued some years ago for lack of funds.

Queen's University

THE Queen's University Military Hospital, No. 7 Canadian General Hospital, left Le Tréport on November 14th to take up its quarters at Etaples. The unit now has accommodation for 2,290 patients and it has been found necessary to enlarge the staff by the addition of twenty-five nurses and a number of orderlies.

Dalhousie University

THE Faculty of Medicine recently established courses of instruction for Fourth Year students in physical therapeutics or in procedures of a therapeutical nature other than those involving the use of drugs. The course includes the following: Lectures and demonstrations in massage, in the technique of the use of the x-rays, in electrical diagnosis and therapeutics, in the medicinal use of baths and high and low temperatures, in climatology and in dietetics.

Western University

THE registration of students in the Western University Medical School for the Session 1916-1917 is as follows:

First year, 23; second year, 9; third year, 15; fourth year, 10; fifth year, 13; making a total of seventy.

At the December meeting of the London Medical Association a paper was read by Dr. McCallum, dean of the Medical Faculty, entitled, "Golden Rules framed from personal experience with facts, fancies, foibles and follies of medicine."

ARMY MEDICAL SERVICES

AMONG the recipients of New Year Honours, conferred by His Majesty the King and announced on December 31st, are the following members of the Canadian Army Medical Corps:

Companions of the Bath. Colonel Herbert Stanley Birkett and Colonel James Alexander Roberts.

Companions of the Order of St. Michael and St. George. Lieutenant-Colonel (temporary Brigadier-General) Robert Rennie and Lieutenant-Colonel Edward Charles Hart.

THE Victoria Cross has been awarded by His Majesty the King to Major Roscoe D. Arnott, C.A.M.C., of Stratford, Ontario, for conspicuous bravery on the field of action.

LIEUTENANT-COLONEL ETHELBERT BROWN HARDY, C.A.M.C., has been decorated with the Distinguished Service Order, for gallantry and devotion to duty in the field. Lieutenant-Colonel Hardy controlled the evacuation of the sick and wounded, and by his energy and courage kept up the spirits of the stretcher-bearers when they were much exhausted.

THE Bar to the Military Cross has been awarded to Captain John Arthur Cullum, M.C., C.A.M.C. Captain Cullum carried out the evacuation of the wounded under very heavy fire with great courage and skill, and at great personal risk and, the *London Gazette* adds, he has on many previous occasions done very fine work.

THE Military Cross has been awarded to the following members of the Canadian Army Medical Corps:

CAPTAIN KENNETH EDGAR COOKE, M.D. Captain Cooke tended the wounded for two days and nights, under intense fire, with great gallantry and ability.

CAPTAIN LEEMING ANDERSON CARR, M.B., son of Dr. Leeming Carr, chairman of the Hamilton Board of Education, for conspicuous gallantry and devotion to duty. He continually led stretcher-bearers under very heavy fire; and on many occasions he himself rescued wounded men. He set a splendid example of courage and determination.

CAPTAIN HOWARD BROWN JEFFS, M.D., of Toronto. Although wounded himself, Captain Jeffs tended the wounded under very heavy fire with great courage and determination.

CAPTAIN HAROLD WIGMORE MCGILL, M.D. Captain McGill attended and dressed the wounded under very heavy fire with great courage and determination.

CAPTAIN VICTOR HENRY KINGSLEY MOOREHOUSE, M.B., son of Dr. H. H. Moorehouse, of Toronto. Captain Moorehouse tended the wounded under very heavy fire, displaying great courage and determination.

CAPTAIN THOMAS FRANCIS O'HAGAN. Captain O'Hagan rescued a wounded officer and five men under very heavy fire. Later he tended the wounded in an advanced dressing-station under heavy fire. He displayed great courage and determination throughout.

CAPTAIN WILLIAM LAWRENCE WHITEMORE, M.B., grandson of Dr. William Oldright, of Toronto. Captain Whittemore, although wounded, carried out his duties with great courage and determination. He displayed great gallantry on many previous occasions.

THE Military Medal has been awarded to the following members of the Canadian Army Medical Corps: Sergeant H. J. Latch, Sergeant P. Mein, Sergeant A. Rowe, Lance-Corporal L. Mills, Private E. Littlejohn, Private A. H. Stewart, Private A. Anderson, Private R. G. Calder, Lance-Corporal G. Falconer, Private R. H. Gale, Sergeant A. J. Harvey, Corporal P. Henry, and Private W. T. Herriot.

THE Distinguished Conduct Medal has been granted to Sergeant A. E. Wartman and Private R. S. Collin, of the Canadian Army Medical Corps.

CAPTAIN A. J. IRELAND, C.A.M.C., who was specially mentioned in dispatches on October 19th, has been transferred to the Royal Army Medical Corps.

CAPTAIN ARTHUR ELLIS, C.A.M.C., has been appointed to succeed Colonel Nasmith, C.M.G., as officer in charge of the sanitary arrangements of the Canadian Expeditionary Forces in France and Flanders. Captain Ellis is a son of Professor Ellis, Dean of the Faculty of Applied Science in the University of Toronto. He was engaged in research work at the Rockefeller Institute when the

war broke out. Captain George Campbell, C.A.M.C., will assist Captain Ellis.

MAJOR CHARLES CARTER, C.A.M.C., has been appointed Deputy Assistant Director of Medical Services in charge of troops at Hamilton, Brantford, St. Catharines, and Niagara Falls, with the temporary rank of Lieutenant-Colonel.

At a Court-Martial held in Toronto on December 12th, Sergeant-Major Frank H. Elliott, C.A.M.C., late acting quartermaster of the Toronto Base Hospital, was deprived of his military rank, dismissed from the Army, and sentenced to eighteen months' imprisonment with hard labour, after having been found guilty of fraudulently misapplying and embezzling foodstuff to the value of \$19.04, and improperly utilizing the time and service of duly enlisted soldiers for the construction of a garage for his own use.

THE Western University Military Hospital is now stationed at Seaford, Sussex, where it occupies the Ravenscroft Hospital building. Several nurses and other members of the unit who have been on duty in France have returned to England and have rejoined the hospital.

THE Ontario Military Hospital, at Orpington, Kent, is to be enlarged to a capacity of 2,014 beds.

CAPTAIN M. A. CARMICHAEL, C.A.M.C., medical officer of the 96th Winnipeg Reserves, has been transferred to the medical training school at Shorncliffe.

CAPTAIN ALFRED HAYWOOD, C.A.M.C., has been given command of the Canadian Convalescent Hospital at Woodcote Park, Epsom. Captain Haywood was assistant medical superintendent of the Toronto General Hospital and went overseas as medical officer of the 3rd Battalion.

THE ST. LAWRENCE COLLEGE at Ramsgate has been fitted up as a Convalescent Home by the Canadian Red Cross Society. The hospital will have accommodation for one thousand patients and will bear the name of Princess Patricia. When ready for occupation it will be placed under the direction of the Canadian Medical Services.

LIEUTENANT-COLONEL G. CLINGAN, C.A.M.C., of Brandon, Manitoba, has been given command of the Canadian Convalescent Hospital at Monks Horton, England. Captain J. M. Eaton, C.A.M.C., has been appointed second-in-command of that hospital.

CAPTAINS W. W. WRIGHT, C. C. Ballantyne, and W. A. McDonald, of the Canadian Army Medical Corps, have left for service overseas.

CAPTAIN E. E. STEELE, C.A.M.C., has been transferred to the General List and is now attached to the Cavalry Training Brigade at Shorncliffe, with the rank of Lieutenant.

THE CANADIAN RED CROSS has granted the sum of one hundred thousand dollars to the Laval Military Hospital (No. 8 Canadian General Hospital), which is to be stationed at Vincennes. The grant is intended for hutments for the accommodation of the hospital. The unit will be situated at the opposite end of Paris to No. 6 Canadian General Hospital, which is at St. Cloud.

THE following promotions in the Canadian Army Medical Corps have been gazetted: To be Lieutenant-Colonels: Majors C. L. Starr, G. R. Phillip and D. K. Smith. To be Major: Captain Harley Smith. To be temporary Majors: Captain C. Hunter, T. D. Archibald, and T. A. Lomer. To be acting Majors: Captain T. H. McKillip and P. Poisson. To be temporary Captains: C. W. Anderson, Captain A. Arthur, H. W. Kerfoot, late Lieutenant R.A.M.C., and G. W. Grant, M.B.

DR. C. C. TATHAM has been appointed medical superintendent of the Strathcona Hospital, Edmonton, which was taken over by the Military Hospitals Commission on December 1st. Dr. H. L. Collins has been appointed to the staff of this hospital and other appointments will be made by the Commission.

MR. S. A. ARMSTRONG, who for the past seven years has been assistant provincial secretary of Ontario, has been appointed director of the Canadian Military Hospitals. Mr. Armstrong will assume complete charge of the organization and supervision of the different branches of the work of these hospitals for the duration of the war.

THE Military Cross has been awarded to the Reverend W. E. Kidd and the Reverend Robert Fleming Thompson, Chaplains to the Canadian Expeditionary Force, for assistance rendered to the wounded.

MAJOR W. W. JUDD and Captain C. H. Hudson have resigned their commissions in the Canadian Army Medical Corps.

THE following members of the Canadian Medical Service are mentioned in despatches in connexion with the operations at Salonica: Colonel J. A. Roberts, Lieutenant-Colonel W. B. Hendry, Lieutenant-Colonel E. C. Hart, Major C. H. Morris, Captain W. A. Clarke, Sergeants W. C. Milne, N. N. McPhedran, G. Nairn, Private T. H. Sayer, Matrons A. J. Hartley, F. Wilson, Sisters A. Dickison, F. A. Hunter, L. Brock, G. McCullough, M. F. Morrison.

CASUALTIES

Died on Service

NURSING SISTER ADRUNNA A. TUPPER, of Bridgewater, Nova Scotia, died in London from illness resulting from heavy work near the trenches in France. Miss Tupper was decorated by His Majesty the King with the Royal Red Cross four days before her death.

Wounded

MAJOR ROSCOE D. ARNOTT, C.A.M.C.

CAPTAIN N. M. MACNEILL, C.A.M.C.

CAPTAIN H. R. MUSTARD, C.A.M.C. This is the second time Captain Mustard has been wounded.

Dangerously Ill

LIEUTENANT W. CLIFFORD M. SCOTT, R.A.M.C., son of Mr. J. G. Scott of Ottawa. Lieutenant Scott graduated in medicine from McGill University in 1914 and afterwards did post-graduate work at the Bellevue Hospital, New York. He joined the Royal Army Medical Corps in January, 1916. Lieutenant Scott was awarded the Military Cross for distinguished conduct at the battle of Thiepval.

Seriously ill

COLONEL C. F. GORRELL, C.A.M.C., of Ottawa, Commandant of the Duchess of Connaught Red Cross Hospital at Taplow.*

* Later reports state that Colonel Gorrell is much better.

Correspondence

TO THE EDITOR,

JOURNAL OF THE CANADIAN MEDICAL ASSOCIATION.

Sir,—I am taking the liberty of sending you under separate cover a marked copy of the weekly issue of *The Times of India* in which is contained a typographical error resulting in a remarkable statement which I thought might bear repeating in the JOURNAL for the amusement of some of the men at home. Such errors are apparently rather common here, perhaps because of native workmen, and another example is afforded by the sign in front of the Allbless Obstetric Hospital, which reads Allbless Obs-tetric Hospital,—a hyphen being interposed without any visible reason. It is quite true, however, that while these mistakes indicate the natives' difficulty in handling the language, they also show poor proof-reading and a peculiar habit of easy-going on the part of somebody who knows better.

You might be interested to know about Canadians whom I have heard about in this part of the world. I do not know their initials in most cases and am not certain of their year of graduation.

There is a man Brown, Toronto, 1908, recovering from enteric at St. George's Hospital in this city.

Little, Toronto, 1914, is on sick leave in India following fever, probably paratyphoid.

Maclachlan, Queen's, is in Colaba Hospital here recovering from fever.

Moon, Toronto, 1914, and Ball, Toronto, 1914, are at the front in Mesopotamia.

Roy Philps, Toronto, 1914, is with No. 23 Indian General Hospital at present at Basra, Mesopotamia.

D. Ramsay, McGill, is at the front in Mesopotamia.

Lyons, Dalhousie, is also in Mesopotamia.

Sincerely yours,

EDWARD FIDLAR,

Lieutenant, R.A.M.C.

BOMBAY, October 10th, 1916.

The above letter will be of interest to some readers of the JOURNAL. Unfortunately, the copy of the *Times of India* to which Dr. Fidler refers has not been received.

Canadian Literature

ORIGINAL CONTRIBUTIONS

The Canadian Practitioner and Review, October, 1916:

- Blood Transfusion: The Author's Technique. Report of eighty-five transfusions L. J. Unger.
Medical problems involved in the classification, treatment, and final disposition of invalided soldiers F. W. Marlow.

The Canadian Practitioner and Review, November, 1916:

- Some of the poisonous plants of Ontario F. Arnold Clarkson.
President's Address before the Toronto Academy of Medicine J. Ferguson.

Dominion Medical Monthly, October, 1916:

- The use of morphine and hyoscine in obstetrics J. A. Kinnear.
The definite treatment of pneumonia. S. S. Cohen.

Dominion Medical Monthly, November, 1916:

- President's Address before the Toronto Academy of Medicine J. Ferguson.
The direct transfusion of blood: its value in hæmorrhage and shock in the treatment of the wounded in war . . A. Primrose and E. S. Ryerson.

The Western Medical News, October, 1916:

- Accessory sinus suppuration, symptoms and complications. A. N. Hardy.

Canada Lancet, November, 1916:

- President's Address before the Toronto
Academy of Medicine J. Ferguson.
Tuberculosis: A social disease Sir James Grant.

La Clinique, October, 1916:

- Quelques idées nouvelles sur la determina-
tion du sexe V. Delfino.

Le Bulletin Médical de Québec, October, 1916:

- Hygiène de l'enfance avant la période
scolaire R. Fortier.
Phlegmons du plancher buccal . . . J. B. Lacroix.

Le Bulletin Médical de Québec, November, 1916:

- La loi des médicaments brevetés ou pro-
prietary L. F. Dubé.
Les remèdes brevetés P. C. Dagneau.
Les sirops calmants A. Jobin.
Médicaments qui guérissent—Médica-
ments inutiles—Médicaments qui
tuent A. Vallee.
Les médicaments brevetés et la fraude par
la poste L. F. Dubé.

La Clinique, November, 1916:

- Le corset G. Juilly.
La loi des médicaments brevetés ou pro-
prietary au Canada L. F. Dubé.
Historique et technique de la cuti-réaction
de la tuberculose M. Imbert.

The Western Medical News, September, 1916:

- Meningococcus meningitis J. G. Fitzgerald.
Medical attendance to the people of the
province J. A. Valens.

The Canadian Journal of Medicine and Surgery, December, 1916:

- Galyl in the treatment of syphilis . . . Gordon Bates.

The Canadian Practitioner and Review, December, 1916:

A case of shell shock E. Ryan.

Dominion Medical Monthly, December, 1916:

The law and the doctor W. R. Riddell

The Public Health Journal, September, 1916:

Retrospective and prospective W. H. Hattie.
 A Federal Bureau of Public Health J. B. Black.
 Some references to the practice of medicine
 then and now G. E. DeWitt.
 Disinfection J. K. McLeod.
 Cerebro-spinal fever from the standpoint
 of epidemiology A. G. Nicholls.

The Public Health Journal, November, 1916:

The defective immigrant C. K. Clarke.
 Presidential address (delivered before the
 Canadian Public Health Association) P. H. Bryce.
 Importance of housing and lodging house
 inspection J. S. Schoales.
 Sanitation as it was A. P. Reid.
 Small water works and sewage R. O. Wynne-Roberts.

Of the early history of medicine in Canada very little is known. The first medical man of whom there is any record is Dr. Bouchard, who was born in Paris in 1622. As a master surgeon he signed his engagement with the "Company of Montreal" in 1653, and four years later married Marguerite Boissel at Quebec, by whom he had nine children. His residence in Montreal was in Notre Dame Street, near the site of the present City Hall. By a contract dated March 30th, 1655, he agreed with twenty-six heads of families to treat the husband, wife, and children, "born and to be born," for one hundred sous each, either party to have the right to withdraw at will. He died at Montreal on July 20th, 1676, at the age of fifty-four years.

Medical Societies

CANADIAN PUBLIC HEALTH ASSOCIATION

At a well attended meeting of the Executive Council of the Canadian Public Health Association held in Toronto on December 12th, 1916, the following were elected to the executive committee for 1916-17: Dr. J. W. S. McCullough, of Toronto; Dr. M. M. Seymour, of Regina, and Dr. W. H. Hattie, of Halifax.

These, with the president, Dr. J. D. Pagé, Quebec, the general secretary, Dr. J. G. Fitzgerald, Toronto, and the treasurer, Dr. George D. Porter, constitute the executive committee of the association.

The 1917 meeting will be held in Ottawa in September.

TORONTO ACADEMY OF MEDICINE

REPORT OF THE PROCEEDINGS OF THE STATED MEETING OF THE ACADEMY OF MEDICINE, TORONTO, DECEMBER 5TH, 1916

PROFESSOR V. C. VAUGHAN in his address upon the subject "The Protein Poison and its Relation to Immunity and Disease," at the December meeting of the Academy of Medicine, discussed the position of the bacteria among living things. According to our conception and definition of vegetable life, we cannot consider bacteria to belong to this group—no cellulose is present—neither do they belong to the animal group. They must be placed in a group of their own.

They contain, instead of a nucleoproteid, a glyco-nucleoproteid. In the study of the chemistry of bacteria the colon bacillus has been used in a large series. Finding that this bacterium when dead, is toxic to animals, an attempt was made to separate the poisonous from the non-poisonous part. The poisonous part is soluble in alcohol and ether, and the non-poisonous is insoluble in alcohol.

Further study was made to find whether non-pathogenic bacteria likewise contain a poisonous and a non-poisonous substance. This was found to be true.

Attempts were made to find out whether a similar poison was found in the higher nucleo-proteids of animal cells, and later vegetable proteins, gluten of wheat, etc., were studied and proven to contain the same poisonous substances.

Every true protein contains a poisonous substance and whatever the source of the protein, the poison is similar.

Those with the larger content of the protein poison are the proteins of our daily food. Casein contains, perhaps, the highest proportion of the protein poison. It is not a poison when administered by the mouth. It is dialysable but dialyses very slowly and is absorbed very slowly from the intestine. It is split up into harmless amino acids by the digestive ferments. While not exactly alike from all its sources, its effects on animals is similar in its lethal properties.

The symptoms and lesions of disease are not due to the growth and multiplication of the infective bacteria in the body. For (1) they are rapidly growing during the stage of incubation when neither symptoms nor lesions are present, and (2) dead bacteria injected into the blood stream cause the same lesions, e.g. in typhoid, dead bacteria will cause all the ulcerative processes.

The strong, vigorous man elaborates substances which kill the invading bacteria. With heavy dose and great resistance the bacteria are rapidly killed and the protein poison sets up acute symptoms. In a study of the records of typhus and typhoid epidemics from those in England and Ireland two hundred years ago down to personal investigations in the American Army in 1898, it is an outstanding fact that the case mortality is greater in the strong and vigorous than in the weak and feeble. The case incidence is greater amongst men than women, in young adults than older adults. In Ireland many years ago it was shown that amongst the poor, half-starved peasants the case mortality was one in twenty-three. Amongst the physicians, nurses, priests and social helpers the mortality was one in two.

The dead bacillus of a species to which an animal is immune rapidly kills the animal from the rapid setting free of the toxic substances. The dead bacillus of a species to which the animal is non-immune does not rapidly kill the animal, but it grows in the animal without the rapid killing and setting free of the protein poison. In the period of infection of an acute infectious disease there are no symptoms, but during the invasion and fastigium the invading bacteria are being destroyed, toxins are set free and the stage of symptoms has arrived. With leucocytosis active there is less toxin set free and symptoms are definitely less.

The subject of anaphylaxis was discussed in short and it was pointed out that when a patient is susceptible to horse serum or diphtheria antitoxin, the injection of one minim will overcome this and in a few hours any quantity may be injected without danger.

Professor Vaughan pointed out that the protein poison is a poison not a toxin. There is no antidote. It does not form an antitoxin.

Vaccines may stimulate protective substances to overcome a localized lesion, but the use, for example, of tuberculin in cases of extensive pulmonary disease seems rash, unscientific and doubtless does much harm in many cases.

The use of vaccine in a patient who is weak, e.g., in advanced myocardial disease, is to be deprecated. The setting free of the protein poison may cause disastrous results.

In closing, Professor Vaughan illustrated his lecture by lantern slides, showing the construction of the large tanks in which he grows his bacteria for chemical study, and a series of charts illustrating the febrile reaction in animals subjected to subcutaneous and intravenous injections of various protein substances, bacillary and non-bacillary in origin.

The paper was discussed by Professor Hunter, Professor J. J. Mackenzie and Major Fitzgerald.

J. H. ELLIOTT,
Honorary Secretary.

PETERBOROUGH MEDICAL SOCIETY

A MEETING of the Peterborough Medical Society was held on November 16th, which was well attended, not only by local men, but also by several members from the surrounding towns. On this occasion a very instructive lecture was given by Dr. Goldwin Howland, of Toronto University, entitled "The simplest method and ultimate object of examining the nervous system." Cases were presented by Dr. Buchanan to enable the lecturer to demonstrate his methods. A hearty vote of thanks to Dr. Howland was proposed by Dr. Gr  er, seconded by Dr. Ford.

The next meeting of the society will be held on December 14th, at which Dr. Ford, of Norwood, will read a paper entitled, "An analysis of three thousand cases of obstetrics."

